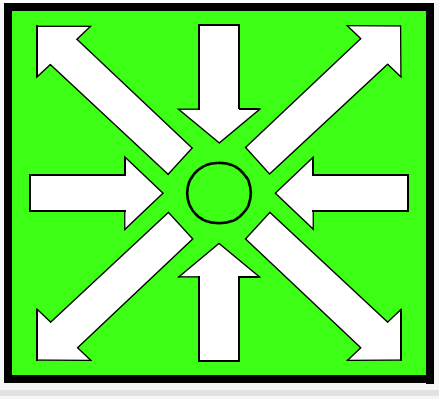
ForeRunner ATM Switch Modules



Supports Management Module SM-FOR1000

APRISMA SPECTRUM® POWERED SOLUTIONS

Device Management

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Introduction

This section introduces the SPECTRUM Device Management documentation for Fore Runner ATM devices in SPECTRUM.

This introduction contains the following topics:

- *Purpose and Scope*
- *Required Reading*
- *Supported Devices* *(Page 8)*
- *The SPECTRUM Model* *(Page 9)*

Purpose and Scope

Use this documentation as a guide for managing ForeRunner ATM devices with the SPECTRUM management module SM-FOR1000. The documentation describes the icons, menus, and views that enable you to remotely monitor, configure, and troubleshoot ForeRunner devices through software models in your SPECTRUM database.

Only information specific to the supported management module is included under this documentation topic. For general information about device management using SPECTRUM and for explanations of basic SPECTRUM functionality and navigation techniques, refer to the topics listed under Required Reading.

Required Reading

You should be familiar with the information provided in the following documents before using this guide.

- ***Getting Started with SPECTRUM for Operators***
- ***Getting Started with SPECTRUM for Administrators***
- ***How to Manage Your Networks with SPECTRUM***
- ***SPECTRUM Views***
- ***SPECTRUM Menus***
- ***SPECTRUM Icons***
- ***SPECTRUM Software Release Notice***

Supported Devices

SPECTRUM management module SM-FOR1000 currently lets you model the following devices:

- Cabletron's 9A000 ATM Switch Module for the SmartSwitch 9000.
- Cabletron's SFCS-200BX and SFCS-1000 SecureFast Cell Switches.
- FORE Systems' ASX-100, ASX-200 series, and ASX-1000 series ATM Switches.

The 9A000 is a dual-slot SmartSwitch 9000 module that provides an aggregate 2.5 Gbps of ATM switching capacity for up to 24 workstations or ATM devices. Its four network module slots can provide a range of LAN and WAN interfaces from 1.5 to 622 Mbps to accommodate ATM.

The SFCS-200BX and SFCS-1000 meet the needs of LAN backbone networks and offer a variety of connectivity options including LAN to ATM access, interswitch links, and WAN access.

The SFCS-200BX is a 2.5 Gbps modular ATM switch for the wiring closet with four network module slots.

The SFCS-1000 is a modular, 10 Gbps backbone ATM switch that includes two 2.5 Gbps switch modules, each containing four network module slots. It provides connectivity for up to 96 ATM servers or LAN access devices.

The ASX100, ASX200 series, and ASX1000 series are stand-alone switches that provide workgroup, LAN, LAN backbone, and WAN access support. They are configurable from 2 to 96 ports, offer a switching capacity ranging from 2.5 to 10 Gbps, and support LAN and WAN interface speeds of 34 to 155 Mbps.

The SPECTRUM Model

SPECTRUM uses the following model types to represent the supported devices and their components.

- ForeRunner (9A000, ForeASX200, etc.)
- ForeSwitchApp
- ATM_Network
- ForeUserApp

Modeling results in the creation of Device icons that represent the devices and Application icons that represent their supported applications.

The Device icons contain double-click zones and provide access to Icon Subviews menus that let you perform device management activities such as those listed in *Tasks* on Page 13.

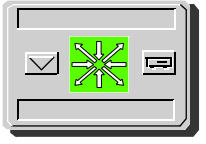
As Figure 1 through Figure 5 show, the appearance of the Device icons varies slightly depending on the kind of view it appears in.

The *Workstation* on Page 11 is modeled as a generic SNMP device (GnSNMPDev). ForeSwitchApp and ForeUserApp are located in the ATM_Network's Device Topology view. (Refer to ***SPECTRUM Views*** for a description of the Device Topology view.)

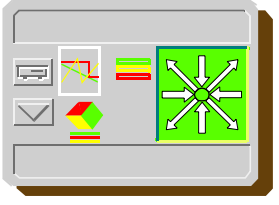
ForeRunner

The device models appear as routers at the Topology, Universe, and Location (room, rack, and panel) levels. Figure 1 shows an example of the ForeRunner Topology and Location view icons.

Figure 1: ForeRunner Icons



Topology View Icon

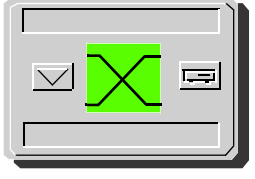


Location View Icon

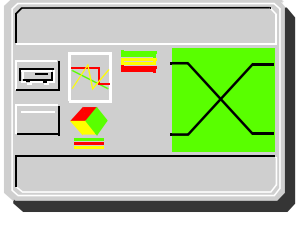
ForeSwitchApp

This model type represents the switch application software. When a ForeRunner model type is created, SPECTRUM automatically creates the ForeSwitchApp model and places it in the ATM part of the ForeRunner model's Device Topology view. Figure 2 shows an example of the ForeSwitchApp Topology and Location View icons.

Figure 2: ForeSwitchApp Icons



Topology View Icon

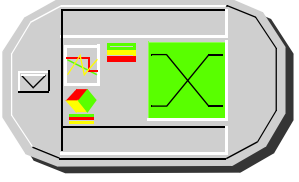


Location View Icon

ATM_Network

This model type is a conceptual model that represents the ATM network. The ForeUserApp and the ForeSwitchApp models are placed into this model's Device Topology view. Figure 3 shows an example of an ATM_Network icon.

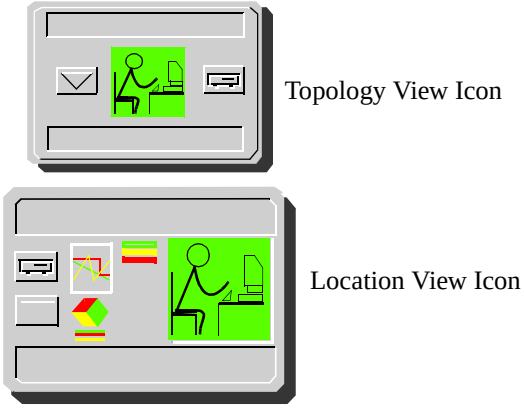
Figure 3: ATM_Network Icon



ForeUserApp

This model type represents the workstation application that is the connection point from the Ethernet LAN to the ATM network. When a workstation model is created with GnSNMPDev, SPECTRUM automatically creates the ForeUserApp model and places it in the GnSNMPDev workstation's Device Topology view. Figure 4 shows an example of the ForeUserApp Topology and Location View icons.

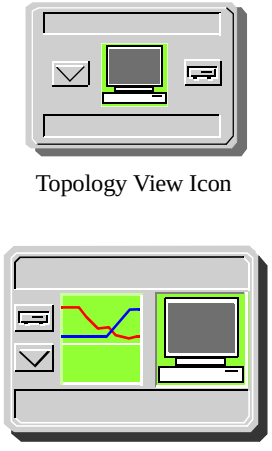
Figure 4: ForeUserApp Icons



Workstation

This model type represents the workstation that contains ForeUserApp. Figure 5 shows an example of the Workstation Topology and Location View icons.

Figure 5: Workstation Icons



The rest of this document covering management module SM-FOR1000 is organized as follows:

- *Tasks* (Page 13)
- *Interface Device Views* (Page 15)
- *ForeRunner Interface Device View* (Page 17)
- *ForeSwitchApp Interface Device View* (Page 24)
- *ForeUserApp Interface Device View* (Page 30)
- *Configuration Views* (Page 36)
- *Application Views* (Page 47)
- *ForeView Application* (Page 109)
- *Networking Characteristics* (Page 110)
- *Manual Modeling* (Page 112)

Tasks

This section provides cross references to the information that lets you perform management and troubleshooting tasks associated with the ForeRunner devices.

Install ForeView Application

- *ForeView Application* (Page 109)

Model ForeRunner

- *Modeling a Single Device and Workstation* (Page 112)
- *Modeling Multiple Devices and Workstations* (Page 117)

Monitor Interface or Port Operation

- *ForeRunner Interface Icon* (Page 17)
- *ForeSwitchApp Interface Icon* (Page 24)
- *ForeUserApp Interface Icon* (Page 30)

Monitor Port Performance

- *Port Performance View (ForeRunner)* (Page 19)
- *Port Performance View (ForeSwitchApp)* (Page 26)
- *Port Performance View (ForeUserApp)* (Page 32)

Monitor ForeRunner Transmission

- *Interface Detail View* (Page 20)
- *Interface Threshold View* (Page 22)

Monitor ForeSwitchApp Transmission

- *Port Detail View (ForeSwitchApp)* (Page 27)
- *ForeSwitchApp Gauge Control Panel* (Page 27)

Monitor ForeUserApp Transmission

- *Port Detail View (ForeUserApp)* (Page 33)
- *ForeUserApp Gauge Control Panel* (Page 35)

View Board, Module, and Port Level Status

- *Fore ATM Switch Configuration View* (Page 37)

View Port Configuration

- *Fore ATM Switch Application Configuration View* (Page 41)

Change IP Configuration Parameters

- *Fore ATM Switch Application Configuration View* (Page 41)

View Workstation ATM Configuration

- *Fore User Application Configuration View* (Page 42)

View Port Admin, Bandwidth, Path Info

- *ForeSwitchApp Port Configuration View* (Page 43)

View Hardware/Software Configuration Info

- *ForeUserApp Configuration View* (Page 44)

View ATM Transmission Status Information

- *Fore ATM SONET Application Configuration View* (Page 45)

Monitor IP Routing Traffic

- *Supported Applications* (Page 48)

View Path and Channel Information

- *Fore Switch Application (ForeSwitchApp)* (Page 50)

Change Paths and Channels

- *Fore Switch Application (ForeSwitchApp)* (Page 50)

View Switch Link and Topology

- *Topology Tables* (Page 55)

View Signaling Information

- *Signaling Tables* (Page 58)

Interface Device Views

This section describes the Interface Device views and subviews available for the devices.

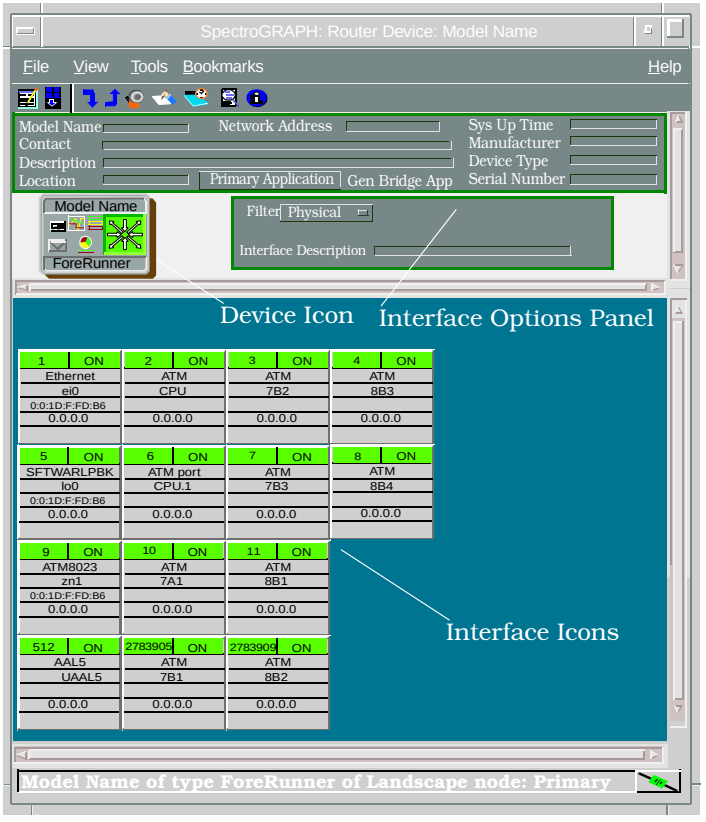
SPECTRUM provides an Interface Device view for each ForeRunner network connection (model type) as follows:

- *ForeRunner Interface Device View*
- *ForeSwitchApp Interface Device View*
- *ForeUserApp Interface Device View* (Page 30).

Figure 6 shows a sample Interface Device view. The view represents both physical and conceptual devices. In general, it provides dynamic configuration and performance information. If the configuration changes, SPECTRUM modifies the Interface Device view after the next polling cycle to reflect the new configuration.

The Interface Device view also provides a model type icon that lets you monitor the device's operation and access other device-specific views.

Figure 6: Interface Device View



The Interface Device view contains Interface icons, which represent the model's interfaces or ports. The icon labels identify the type of interface or port, provide configuration and operational status information, and provide double-click zone access to views.

The following sections describe the Interface icons and Interface Options panel for each Interface Device view.

The procedures for accessing the Interface Device views are the same for all model types. Use one of the following procedures:

- Double-click the Device view access button on the model type icon.
- Highlight the model type icon and select **View > Icon Subviews > Device**.
- Click and hold the model type icon using the appropriate mouse button (right or middle) to bring up the Pop-up Navigator menu and then select **Device**.

ForeRunner Interface Device View

This section describes the Interface icon and the views accessible from it.

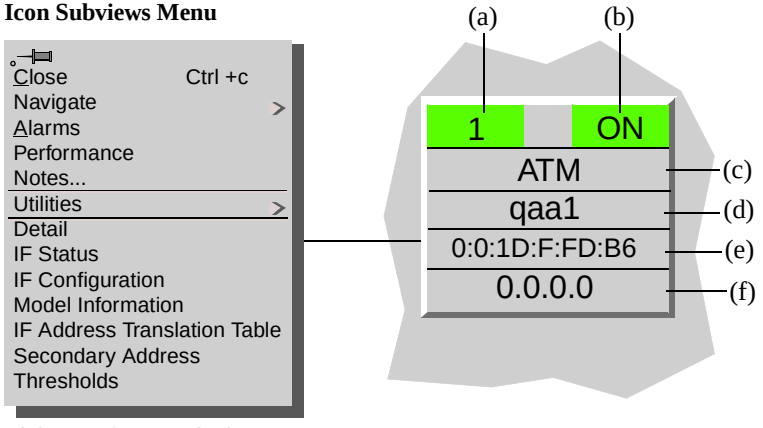
ForeRunner Interface Icon

These icons represent the interfaces of the device. The icons identify the type of interface or port and provide statistical information. Figure 7 shows an example of a ForeRunner Interface icon, its Icon Subviews menu, and its labels/double-click zones.

Note:

The callouts (a through g) displayed in the illustration below identify the label and, if available, the view to which it provides double-click zone access. For example, the icon area referred to by callout (b) displays the administrative status and provides double-click access to the Interface Status view.
The menu displayed in the illustration is the Icon Subviews menu for that Interface icon.

Figure 7: Interface Icon in the ForeRunner Interface Device View



(a) Interface Label

(b) Administrative Status Label/IF Status View

(c) Interface Type Label/IF Configuration View

(d) Description Label/Model Information View

(e) MAC Address Label/IF Address Translation Table View

(f) Address Label/ Secondary Address Panel

ForeRunner Interface Icon Labels

This section describes the labels on the Interface Icon. See Figure 7.

Interface Label

This label displays the interface (port) number.

Administrative Status Label

This label displays the status of this interface for the primary application selected (Routing, MIB-II, etc.). The possible states are ON (Green), OFF (Blue), and Testing (Red). Double-click this label to open the *Interface Status View* (Page 21).

Interface Type Label

This label displays the interface type. All of the devices display **Other** as the interface type. Double-click this label to open the *Fore Switch Interface Configuration View* (Page 21).

Description Label

This label displays the type of port signaling. This information is also displayed in the **Description** field of the Model Information view. Double-click this label to open the Model Information view (described in ***SPECTRUM Views***).

MAC Address Label

This label displays the address of the device interface. Double-click this label to open the *Interface Address Translation Table View* (Page 21).

Address Label

This label displays the address or mask. The default is the address. Double-click this label to open the *Secondary Address View* (Page 22).

To change this label's display, do the following:

1. Double-click the label to open the Secondary Address view.
2. Select the address you wish to display and click **OK**.

Port Performance View (ForeRunner)

This view displays statistics for the port (Interface icon) selected. A multi-attribute line graph shows the port activity. You can change the graph properties via the **Graph Properties** drop-down menu and **Lin/Log** toggle described below. This view also contains a table displaying transmission statistics. Current, average, and peak values are shown. The attributes displayed are pre-selected and the colors used represent different statistics as described in Table 1. Refer to the ***SPECTRUM Views*** for more detailed information on the Performance view.

Table 1: Performance Statistic Color Definitions

Statistic	Color
Load	Green
Packet Rate	Blue
% Error	Red
% Discarded	Grey

ForeRunner Interface Icon Subviews

Table 2 lists the device-specific Interface icon subviews menu selections.

Table 2: ForeRunner Interface Icon Subviews Menu Selections

Menu Selection	Description
Detail	*Interface Detail View* (Page 20).
IF Status	*Interface Status View* (Page 21).
IF Configuration	*Fore Switch Interface Configuration View* (Page 21).
Model Information	Model Information view described in ***SPECTRUM Views***.
IF Address Translation Table	*Interface Address Translation Table View* (Page 21).
Secondary Address Panel	*Secondary Address View* (Page 22).
Thresholds	*Interface Threshold View* (Page 22).

The following sections describe the views that are accessible from the Icon Subviews menu and via double-click zones on the Interface icon. See Figure 7 (Page 17).

Interface Detail View

This view provides color-coded pie charts that display transmission statistics for the selected interface. Three buttons at the bottom of each pie chart select the way in which the data is represented (**Total**, **Delta**, **Accum**). Another button, **Clear**, works in conjunction with the **Accum** button. For more information on pie charts and the use of these buttons, refer to the ***SPECTRUM Views* documentation**. Table 3, Table 4, and Table 5 list the information provided by these pie charts.

Table 3: Packet Breakdown

Statistic	Definition
Delivered	Packets delivered to a higher level protocol.
Transmitted	Packets transmitted.
Errors	Packets received containing errors.
Discards	Packets discarded.

Table 4: Error Breakdown

Statistic	Definition
In Errors	The total number of ICMP messages that the SNMP device received or attempted to transmit containing errors.
Out Errors	The total number of ICMP messages that the SNMP device did not transmit because of errors.

Table 5: Discard Breakdown

Statistic	Definition
Unknown	Unknown packet types received.
In No Resource	Received packets discarded, even though no errors were encountered to prevent their continued processing. Such packets may have been discarded to increase buffer space.
Out No Resource	Transmitted packets discarded, even though no errors were encountered to prevent their continued processing. Such packets may have been discarded to increase buffer space.

Interface Status View

This view provides the following information for the selected interface:

Operational Status
A read-only indicator displaying the current operational state of the interface. The possible states are `ON`, `OFF`, `Testing`, and `Default`.

Administrative Status
A drop-down menu button that lets you select the operational state of the interface. The possible states are `ON`, `OFF`, `Testing`, and `Default`.

Fore Switch Interface Configuration View

This view displays the following information for the selected interface:

Operation Status
A read-only indicator that shows the current operational state of the port (`ON`, `OFF`, `Testing`, or `Default`).

Admin. Status
A drop-down menu button that lets you select the operational state of the port (`ON`, `OFF`, or `Testing`). This can be seen on the Administrative Status Label.

Description
The description of the interface.

Network Name/Address
The network name and IP address of the interface.

Physical Address
The physical (MAC) address of the port.

Bandwidth
The estimated bandwidth of the interface measured in bits per second. For interfaces that do not vary in bandwidth or for which no accurate estimate can be made, a nominal bandwidth is provided.

Packet Size
The size of the packets being transmitted or received.

Interface Address Translation Table View

This view displays the following information for the selected interface:

Interface Index
The value identifying the port.

Physical Address
The physical (MAC) address of the port.

Sort

Sorts the table columns.

Find

Searches for a particular entry in the table.

Update

Updates the table with the latest configuration information.

Secondary Address View

This view displays the following information for the selected interface.

Address
The IP address of the interface.

Mask
The mask address of the interface.

Interface Threshold View

This view displays the following information for the selected interface.

Load Threshold
The ON and OFF values set to determine the point at which a load alarm will be turned on or off.

Packet Rate Threshold
The ON and OFF values set to determine the point at which a packet transmission alarm will be turned on or off.

Error Rate Threshold
The ON and OFF values set to determine the point at which an error alarm will be turned on or off.

% Discarded Threshold
The ON and OFF values set to determine the point at which an alarm will be turned on or off.

ForeRunner Interface Options Panel

This panel (see Figure 6 (Page 15)) lets you modify the presentation of a highlighted Interface icon. Double-click a non-text area of this panel to open the ForeRunner Gauge Control Panel described below.

The Interface Options panel provides the following information.

Find

This drop-down menu lets you search for a model or group of models based on the physical address, IP address, model type, or network name.

Interface Description

This field describes the interface of the highlighted Interface icon. If no Interface icon is highlighted, the field is empty or shows the interface previously highlighted.

Gauge Mode

This selection panel lets you select the type of information shown on the Gauge label of the Interface icon: Rates, Totals, or Percentages. The Percentages selection displays the percentage of the selected interface compared to the rest of the interfaces.

ForeSwitchApp Interface Device View

This section describes the Interface icon and the views accessible from it.

ForeSwitchApp Interface Icon

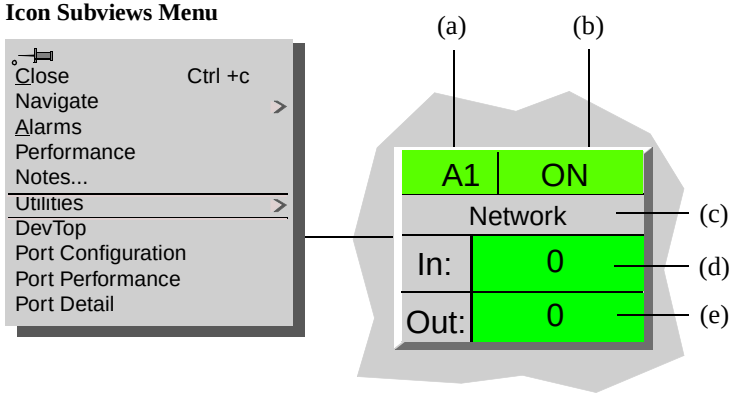
These icons represent the interfaces of the device. The icons identify the type of interface or port and provide statistical information. Figure 8 shows an example of a ForeSwitchApp Interface icon, its Icon Subviews menu, and its labels/double-click zones.

Note:

The callouts (a through e) displayed in the illustration below identify the label and, if available, the view to which it provides double-click zone access. For example, the icon area referred to by callout (b) displays the interface's administrative status and provides double-click access to the Port Configuration view.

The menu displayed in the illustration is the Icon Subviews menu for that Interface icon.

Figure 8: Interface Icon in the ForeSwitchApp Interface Device View



(a) Interface Label/DevTop View

(b) Administrative Status Label/Port Configuration View

(c) Interface Type Label

(d) Inbound Gauge Label/Port Performance View

(e) Outbound Gauge Label/Port Detail View

ForeSwitchApp Interface Icon Labels

This section describes the labels on the ForeSwitchApp Interface icon. See Figure 8.

Interface Label

This label displays the interface (port) number. Double-click this label to open the Device Topology view described in the ***SPECTRUM Views***.

Administrative Status Label

This label displays the status of this interface for the primary application selected (Routing, MIB-II, etc.). The possible states are ON (Green), OFF (Blue), and Testing (Red). Double-click this label to open the *ForeSwitchApp Port Configuration View* (Page 43).

Interface Type Label

This label displays the type of interface.

Inbound Gauge Label

This label displays the performance statistic determined by the Gauge Control Panel for this interface. The *ForeSwitchApp Gauge Control Panel* (Page 27). Double-click this label to open the *Port Performance View (ForeSwitchApp)* (Page 26).

Outbound Gauge Label

This label displays the performance statistic determined by the Gauge Control Panel for this interface. The *ForeSwitchApp Gauge Control Panel* (Page 27). Double-click this label to open the *Port Detail View (ForeSwitchApp)* (Page 27).

ForeSwitchApp Interface Icon Subviews

This section describes the views that are accessible from the Icon Subviews menu and via double-click zones on the Interface icon (see Figure 8). Table 6 lists the Interface icon device-specific subviews menu selections.

Table 6: ForeSwitchApp Interface Icon Subviews Menu

Menu Selection	Description
DevTop	Opens the Device Topology view described in the ***SPECTRUM Views.***
Port Configuration	Opens the *ForeSwitchApp Port Configuration View* (Page 43).
Port Performance	Opens the *Port Performance View (ForeSwitchApp)* (Page 26).
Port Detail	Opens the *Port Detail View (ForeSwitchApp)* (Page 27).

Port Performance View (ForeSwitchApp)

This view displays statistics for the port (Interface icon) selected. A multi-attribute line graph shows the port activity. You can change the graph properties via the **Graph Properties** drop-down menu and **Lin/Log** toggle described below. This view also contains a table displaying transmission statistics. Current, average, and peak values are shown. The attributes displayed are pre-selected and the colors used represent different statistics as described in Table 7. Refer to the ***SPECTRUM Views*** for more detailed information on the Performance view.

Table 7: Performance Statistic Color Definitions

Statistic	Color
In Load	Green
In Cell Rate	Blue
Error Rate	Red
Out Load	Yellow
Out Cell Rate	Blue
% Discard	Grey

Port Detail View (ForeSwitchApp)

This view provides a color-coded pie chart displaying port transmission statistics. Three buttons at the bottom of the pie chart select the way in which the data is represented (**Total**, **Delta**, **Accum**). Another button, **Clear**, works in conjunction with the **Accum** button. Refer to the ***SPECTRUM Views*** for more information on pie charts and the use of these buttons. Table 8 lists the information provided by the pie chart.

Table 8: Cell Breakdown

Statistic	Description
Received	The number of ATM cells received
Transmitted	The number of ATM cells transmitted
Errors	The number of ATM cells received containing errors
Discards	The number of ATM cells discarded

ForeSwitchApp Interface Options Panel

This area of the Interface Device view lets you modify the presentation of a highlighted Interface icon. Double-click a non-text area of this panel to open the Gauge Control Panel described below. The Interface Options panel provides the following information.

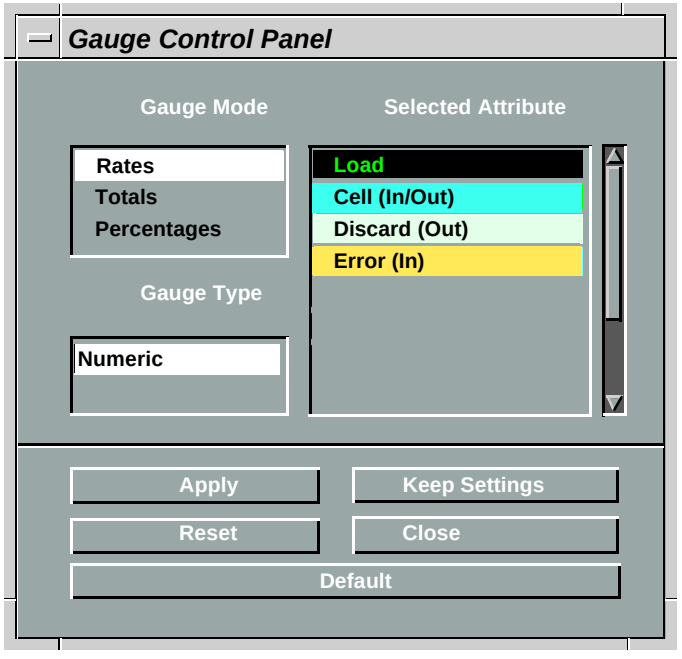
Interface Description

This field provides a description of the highlighted interface. If no interface is highlighted, this field is empty or shows the interface previously highlighted.

ForeSwitchApp Gauge Control Panel

This view (Figure 9) lets you change the type of statistics displayed on the Interface icon Gauge labels. To access the Gauge Control Panel, double-click the background of the Interface Options panel, or highlight the Interface Options panel and select **View -> Icon Subviews -> Gauge Control Panel**.

Figure 9: Gauge Control Panel for the ForeSwitchApp Model Type



The Gauge Control Panel provides the following selection panels and gauge buttons:

- Gauge Mode selection panel
- Selected Attribute selection panel
- Gauge Type selection panel
- Gauge buttons

Gauge Mode

This selection panel lets you select the type of information shown on the Gauge label of the Interface icon: Rates, Totals, or Percentages. The Percentages selection displays the percentage of the selected interface compared to the rest of the interfaces.

The color displayed on the Gauge label depends upon the particular mode and statistical attribute selected. Table 9 and Table 10 list the attributes and their corresponding colors for the Totals mode and Rates mode, respectively.

Table 9: Totals Mode: Attributes and Corresponding Color

Selected Attribute	Color
Octets (In/Out)	Green
Cells (In/Out)	Blue
Allocated Bandwidth (In/Out)	Blue
Used Bandwidth (In/Out)	Blue
Discards (Out)	Gray
Errors (In)	Orange

Table 10: Rates Mode: Attributes and Corresponding Color

Selected Attribute	Color
Load (In/Out)	Green
Cell (In/Out)	Blue
Discard (Out)	Gray
Error (In)	Orange

Selected Attribute

This selection panel lets you select the statistical attribute displayed on the Interface icon's Gauge label. The label changes color to reflect the attribute selected.

Gauge Type

This selection panel lets you select either a numeric or linear display on the Gauge label.

Apply

Applies the current settings to the Gauge label for as long as the view is open.

Keep Settings

Saves the current settings while SpectroGRAPH is running. Settings return to default when you restart SpectroGRAPH.

Reset

Returns the settings to the previously saved values.

Close

Closes the Gauge Control Panel.

Default

Returns the settings to the SPECTRUM default.

ForeUserApp Interface Device View

This section describes the Interface icon and the views accessible from it.

ForeUserApp Interface Icon

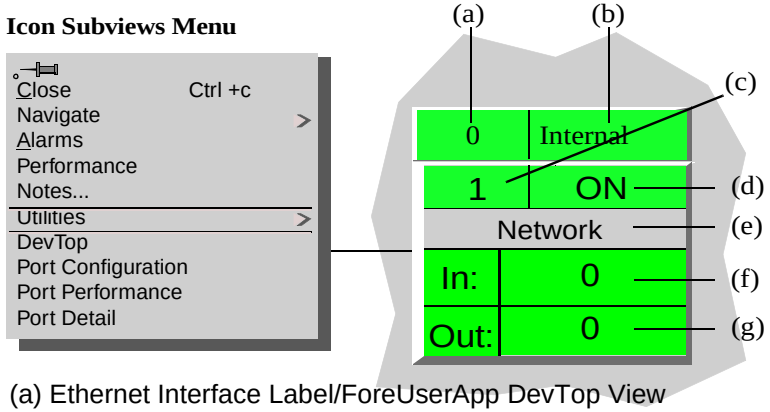
These icons represent the device interfaces on which the workstations are connected. The icons identify the type of interface and provide statistical information. Figure 10 shows an example of the ForeUserApp Interface icon, its Icon Subviews menu, and its labels/double-click zones.

Note:

The callouts (a through g) displayed in the illustration below identify the label and, if available, the view to which it provides double-click zone access. For example, the icon area referred to by callout (d) displays the ATM administrative status and provides double-click access to the ForeUserApp Configuration view.

The menu displayed in the illustration is the Icon Subviews menu for that Interface icon.

Figure 10: Interface Icon in the ForeUserApp Interface Device View



(a) Ethernet Interface Label/ForeUserApp DevTop View

(b) Ethernet Network Information Label

(c) ATM Interface Label/ForeUserApp DevTop View

(d) ATM Administrative Status Label/ ForeUserApp Configuration View

(e) ATM Interface Type Label

(f) Inbound Gauge Label/ForeUserApp Port Performance View

(g) Outbound Gauge Label/ForeUserApp Port Detail View

ForeUserApp Interface Icon Labels

This section describes the labels on the Interface Icons contained in the ForeUserApp Device view (see Figure 10).

Ethernet Interface Label

This label displays the Ethernet interface (port) number. Double-click this label to open the ForeUserApp DevTop view described in the ***SPECTRUM Views***.

Ethernet Network Information Label

This label displays user-selectable network information. To change this label's display, use the *ForeUserApp Interface Options Panel* (Page 35).

ATM Interface Label

This label displays the ATM interface (port) number. Double-click this label to open the ForeUserApp DevTop view described in the ***SPECTRUM Views***.

ATM Administrative Status Label

This label displays the status of this interface for the primary application selected (Routing, MIB-II, etc.). The possible states are ON (Green), OFF (Blue), and Testing (Red). Double-click this label to open the *Fore User Application Configuration View* (Page 42).

ATM Interface Type Label

This label displays the type of ATM interface.

Inbound Gauge Label

This label displays the performance statistic determined by the Gauge Control Panel for this interface. The Gauge Control Panel is described under *ForeUserApp Gauge Control Panel* (Page 35). Double-click this label to open the ForeUserApp *Port Performance View (ForeSwitchApp)* (Page 26).

Outbound Gauge Label

This label displays the performance statistic determined by the Gauge Control Panel for this interface. The Gauge Control Panel is described under *ForeUserApp Gauge Control Panel* (Page 35). Double-click this label to open the ForeUserApp Port Detail view described below.

ForeUserApp Interface Icons Subviews

This section describes the views that are accessible from the Icon Subviews menu and from the double-click zones on the Interface icon (see Figure 10 (Page 30)). Table 11 lists the Interface icon device-specific subviews menu selections.

Table 11: ForeUserApp Interface Icon Subviews Menu

Menu Selection	Description
DevTop	Opens the Device Topology view described in the ***SPECTRUM Views.***
Port Configuration	Opens the *Fore User Application Configuration View* (Page 42).
Port Performance	Opens the ForeUserApp *Port Performance View (ForeSwitchApp)* (Page 26) described below.
Port Detail	Opens the ForeUserApp *Port Detail View (ForeSwitchApp)* (Page 27).

Port Performance View (ForeUserApp)

This view includes two subviews: Detail and AAL Detail. Access the ForeUserApp Port Performance view and its subviews as follows:

- Select **View -> Icon Subviews -> Port Performance**.
- Select **Detail** from the Performance view.
- Select **AAL Detail** from the Detail view.

The Port Performance view displays a breakdown of statistics for the port. A multi-attribute line graph provides a general indication of device activity. The attributes displayed are pre-selected and the colors used represent different statistics. Buttons allow you to modify the statistical presentation of the multi-attribute line graph. Table 12 lists the color definitions for the port statistics. Refer to the ***SPECTRUM Views*** for more information on the Performance view.

Table 12: Performance Statistic Color Definitions

Statistic	Color
In Load	Green
In Cell Rate	Light Blue
Error Rate	Red
Out Load	Yellow
Out Cell Rate	Blue
Discarded	Grey

Port Detail View (ForeUserApp)

This view provides color-coded pie charts displaying statistical information. Three buttons at the bottom of each pie chart select the way in which the data is represented (**Total**, **Delta**, **Accum**). Another button, **Clear**, works in conjunction with the **Accum** button. Statistics are provided on cells and ATM layer data, broken down as listed in Table 13 and Table 14. Refer to the ***SPECTRUM Views*** for more information on pie charts.

Table 13: Cell Breakdown

Statistic	Description
Received	The number of ATM cells received.
Transmitted	The number of ATM cells transmitted.
Errors	The number of ATM cells received containing errors.
Discards	The number of ATM cells discarded.

Table 14: ATM Layer

Statistic	Description
Received	The number of ATM cells received.
Transmitted	The number of ATM cells transmitted.
Out of Range VPIs	The number of ATM cells received with VPI values that were out of range.
Unconnected VPIs	The number of ATM cells received with VPI values that were in range but did not correspond to active connections.
Out of Range VCIs	The number of ATM cells received with VCI values that were out of range.
Unconnected VCIs	The number of ATM cells received with VCI values that were in range but did not correspond to active connections.

AAL Detail View

This view provides information on cell breakdown for AAL0, AAL4 and AAL5. All breakdowns provide information on cells received, cells transmitted, discarded cells, and total cells. CRC and CS Protocol Errors are reported in AAL4 and AAL5. SAR Protocol Errors are reported in AAL4 only, as listed in Table 15, Table 16, and Table 17.

Table 15: AAL0 Cell Breakdown

Statistic	Description
Received	The number of AAL type 0 cells received.
Transmitted	The number of AAL type 0 cells transmitted.
Discards	The number of ATM cells that the adaptation layer discarded in the course of dropping partially reassembled protocol data units (PDUs).

Table 16: AAL4 Cell Breakdown

Statistic	Description
Received	The number of AAL type 4 cells received.
Transmitted	The number of AAL type 4 cells transmitted.
CRC Errors	The number of ATM cells received with payload CRC errors.
SAR Port Errors	The number of ATM cells that the adaptation layer rejected due to SAR layer protocol errors.
CS Port Errors	The number of ATM cells that the adaptation layer rejected due to CS layer protocol errors.
Discards	The number of ATM cells that the adaptation layer discarded in the course of dropping partially reassembled PDUs.

Table 17: AAL5 Cell Breakdown

Statistics	Description
Received	The number of AAL type 5 cells received.
Transmitted	The number of AAL type 5 cells transmitted.
CRC Errors	The number of CS-PDUs received with protocol data unit CRC errors.
CS Port Errors	The number of CS-PDU's that the adaptation layer rejected due to CS layer protocol errors.
Discards	The number of ATM cells that the adaptation layer discarded in the course of dropping partially reassembled PDUs.

ForeUserApp Interface Options Panel

This area of the Interface Device view lets you modify the presentation of a highlighted icon. Double-click a non-text area of this panel to open the Gauge Control Panel described below. The Interface Options panel provides the following information.

Interface Description

This field describes the interface of the highlighted Interface icon. If no Interface icon is highlighted, this field is empty or shows the interface previously highlighted.

ForeUserApp Gauge Control Panel

This view is the same as the Gauge Control Panel for the ForeSwitchApp model type (see Figure 9 (Page 28)).

Configuration Views

This section describes the configuration views, which display MIB information for the devices and applications.

Introduction

The following configuration views are available for the devices:

- The *Fore ATM Switch Configuration View* (Page 37) provides board, module, and port level administrative details and operational information.
- The *Fore ATM Switch Application Configuration View* (Page 41) provides port configuration information and allows you to change some IP configuration parameters.
- The *Fore User Application Configuration View* (Page 42) displays the workstation ATM configuration.
- The *ForeSwitchApp Port Configuration View* (Page 43) provides port-specific administration, bandwidth, and path information.
- *ForeUserApp Configuration View* (Page 44) provides workstation hardware and software configuration information.
- *Fore ATM SONET Application Configuration View* (Page 45) provides ATM transmission status information.

Note: The Fore ATM SONET Application Configuration view is provided as an example of a typical application configuration view. Your system may not have this application (i.e., SONET OC-3) or it may have other applications (such as DS-1, DS-2, etc.) depending on the network modules installed in your devices. All of these configuration views provide similar information.

In general, you access the device configuration views from the model type icons (ForeSwitchApp, ForeUserApp, etc.) For these views, highlight the model type icon and select **View -> Icon Subviews -> Configuration**.

You access port-specific configuration views from the Interface icons within the Device Interface view. For these views, highlight the Interface icon for the desired interface and select **View -> Icon Subviews -> Configuration**.

Note:

You can use the mouse button (right or middle) to access the Configuration views. Click the icon to access the Pop-up Navigator menu and select **Configuration**.

Fore ATM Switch Configuration View

This configuration view displays the information listed below.

1. The Banner (within the green border area) provides descriptive information about the model as described in ***SPECTRUM Views***.
2. The four fields below the Banner display the software and hardware version numbers, the signaling control software identification, and the ATM address of the device.
3. The buttons are as follows:

IP Translation

Opens the Interface Address Translation Table.

Environment

Opens the ATM Switch Environment View, which displays additional options for monitoring environmental attributes.

Utilization

Opens the Processor Utilization View, which displays current, maximum, and minimum load percentages.

SNMP Agent

Opens the SNMP Agent Configuration View.

SNMP Traps

Opens the Fore ATM Switch Application Trap Destination Table view, which displays instructions for setting destinations. For more information on setting traps, refer to the ***SPECTRUM Portable Management Application Tools Guide.***

Alarms

Opens the Fore ATM Switch Alarm Table view, which lists alarm, log, and trap action information. For more information, refer to the ***SPECTRUM Portable Management Application Tools Guide.***

Buffers

Opens the Buffer Table described below.

4 The configuration view tables (Board, Module, and Interface) are the main focus of the Fore ATM Switch Configuration view. These tables provide board-level, module-level, and port-level administrative details (such as names and addresses) and operational information (such as signaling type, port on/off status, port speed, and datagram size). The configuration view tables also provide double-click access zones and buttons that are common to all of the tables, including the Buffer Table. These common items are described below, followed by descriptions of each table.

Double Click Access Zones

Each row of data in the configuration tables provides double-click access to a detail view, which provides information specific to the row. Click on any field within a row to access the detail view for the row. The detail view accessed from the Interface Table permits you to change the administrative status of the selected port.

Configuration Table Buttons

Each configuration table contains the buttons described below.

Sort

Sorts the items listed in the columns. Click the column heading of the column you want to sort (which makes **Sort** available) and click **Sort**.

Find

A search feature that is not yet implemented.

Update

Returns the table to its default sort order and updates the display.

Buffer Table

This table provides information concerning the type and size of the ATM switch output buffer. Click **Buffers** in the Fore ATM Switch Configuration view to access this table.

Board
The index of this output buffer's switch board.

Num. Buffers
The number of this output buffer.

Type
The type of this output buffer.

Oper. Status
The operational status of this output buffer.

Buffer Size
The logical size of this output buffer, in cells.

Queue Length
The number of cells in this output buffer.

Overflows
The number of cells dropped because the output buffer was full.

Board Table

This table provides the following identification information for the ATM switch output buffer:

Version
The ATM switch board version number.

Model
The ATM switch board model number.

Serial Number
The ATM switch board serial number.

Number Of Modules
The number of network modules on this ATM switch board.

Module Table

This table provides the following configuration information concerning the ATM switch network module:

Board
The index of this board within the ATM switch.

Number
The number of this network module within the ATM switch.

Name
The type name of this network module within the ATM switch.

Speed
The speed of this network module within the ATM switch.

Number Of Ports
The number of ports on this network module.

UpTime
The time since this network module was created, in hundredths of a second.

Interface Table

This table provides the following port status information for the ATM switch:

Index
The value identifying the port.

Description
The textural description of the interface.

Admin Status
The desired state of this port (`ON`, `OFF`, or `TEST`).

Oper Status
The current operational state of this port (`ON`, `OFF`, or `TEST`).

MAC Address
The MAC address of the port.

Speed
The speed of this port within the ATM switch.

Type
The type of this port.

Mtu (Message Transfer Unit)
The size of the largest datagram that can be sent or received on the interface, specified in octets. For interfaces that are red transmitting network datagrams, this is the size of the largest network datagram that can be sent on the interface.

Fore ATM Switch Application Configuration View

This view provides board-specific configuration information and allows you to change some of the IP configuration parameters. Each row of data in the view provides double-click access to a Port view that provides information specific to the row and permits you to change the loopback and administrative status of the selected module. Click on any field contained within a row to access the Port view.

The Fore ATM Switch Application Configuration view provides three fields and a Port Table as follows:

Num. of Ports
The number of ports available on the device.

Policing Action
The action the device will take in case of a bandwidth violation on this channel.

CDV (Cell Delay Variation)
The time window in which a cell may be received on a channel and be accepted.

Port Table

This table provides the following port information for the devices:

Board
The index of this port's switch board.

Module
The network module of this port.

Port
The number of this port within its network module.

Version
The version number of this port's network module.

Model
The model number of this port's network module.

Oper. Status
The operational status of this port.

Buffer Size
The logical size of this port's output buffer, in cells.

Queue Length
The number of cells in this port's output buffer.

Overflows
The number of cells dropped because the output buffer was full.

Errors
The number of cells containing errors.

Carrier
The presence or absence of a carrier at this port.

Global Index
The global index of this port within the ATM switch as a whole.

Name
The name of the port indicating the board network module and port identifiers.

Admin Status
The administrative state of the physical layer of this port. When a port is configured “Up”, the physical layer is configured to process all physical layer events including the transmission and reception of data (cells). When a port is configured “Down”, the physical layer is shut down and ignores all physical layer events.

Fore User Application Configuration View

This view includes the following fields that describe the workstation ATM configuration.

Hardware Version
The version of the ATM adaptor hardware. The number is encoded into six hexadecimal digits.

Hardware Speed
The speed of the ATM adaptor hardware.

Firmware Version
The version of the ATM adaptor firmware. The number is encoded into six hexadecimal digits.

Software Version
The version of the ATM adaptor software. The number is encoded into six hexadecimal digits.

Uptime
The length of time since the workstation connection was created, in hundredths of a second.

Serial Number
The serial number of the ATM adaptor hardware.

Adapter Type
The workstation adapter type number

Rec Carrier
The presence or absence of a carrier on the link.

Port Number
The number of the port selected.

Oper Status
The current operational state of the adaptor.

ATM Address
The address of this ATM adaptor.

Physical Layer
The physical layer of the adaptor.

ForeSwitchApp Port Configuration View

This view provides the following port specific information.

Port Number
Identifies the port.

Port Uptime
The length of time this port has been in its current state.

Port Hw Board
The hardware board number of this port.

Port Hw Module
The hardware module number of this port.

Port Hw Number
The hardware port number of this port.

Remote ATM Address
The ATM address of the entity connected to this port.

Remote IP Address
The IP address of the entity connected to this port.

ILMI Remote Address
The Integrated Layer Management Interface (ILMI) address of the entity connected to this port. Default is 255.255.255.255.

Administrative Status
The desired state of this port. The dynamic state indicates that a link monitoring protocol is used to determine the operational status of the port.

Operational Status
The current operational state of this port

Bandwidth In Max/Out Max
The maximum incoming/outgoing bandwidth of this port, in cells per second.

Bandwidth In Allocated/Out Allocated
The allocated incoming/outgoing bandwidth of this port, in cells per second.

Bandwidth In Used/Out Used
The incoming/outgoing bandwidth being used on this port, in cells per second.

Paths In Max/Out Max
The maximum number of incoming/outgoing virtual paths supported by this port.

Paths In Number/Out Number
The number of incoming/outgoing virtual paths being used on this port.

The Port Configuration view also contains five buttons that access the *Path Tables* (Page 51).

ForeUserApp Configuration View

This view provides the following port specific information.

Hardware Version
The version of the ATM adaptor hardware. The number is encoded into six hexadecimal digits.

Hardware Speed
The speed of the ATM adaptor hardware.

Firmware Version
The version of the ATM adaptor firmware. The number is encoded into six hexadecimal digits.

Software Version
The version of the ATM adaptor software. The number is encoded into six hexadecimal digits.

Uptime
The length of time that the port has been in its current state.

Serial Number
The serial number of the ATM adaptor hardware.

Adaptor Type
The hardware type of the adaptor.

Rec Carrier
The presence or absence of a carrier on the link.

Port Number
The number of the port selected.

Oper Status
The current operational state of the adaptor.

ATM Address
The address of this ATM adaptor.

Physical Layer
The physical layer of the adaptor.

Fore ATM SONET Application Configuration View

Access: *From the **Icon Subviews** menu for the Fore_Sonet_App icon in the Application view, select **Configuration**.*

The Fore ATM SONET Application Configuration view is provided as an example of a typical application configuration view. Your system may not have this application (i.e., SONET OC-3) or it may have other applications (such as DS-1, DS-2, etc.) depending on the network modules installed in your devices. All of these configuration views provide similar information.

In general, the application configuration view provides port-specific configuration information and allows you to change some of the transmission parameters. Each row of data in the view provides double-click access to a detail view that provides information specific to the row. Click on any field contained within a row to access the detail view for the row.

The detail view accessed from the Fore ATM SONET Application Configuration view permits you to control transmit and receive descrambling and change the framing operator and loopback configuration of the selected port.

The Fore ATM SONET Application Configuration view provides the following fields.

Board
The index of this port's switch board.

Module
The network module of this port.

Port
The number of the port within the network module.

Line Type
The line type for the interface. The possible values are `Other`, `Single mode short range`, `Single mode medium range`, `Multimode`, `UTP`, or `Coax`. The default is `Multimode`.

Line Coding
The line coding for the interface. The possible values are `Other`, `B3ZS`, `CMI`, or `NRZ`. The default is `NRZ`.

Framing Default
The default value of the framing standard used by the port. The possible values are `SONET` or `SDH`.

Framing Oper
The operational value of the framing standard used by the port. The possible values are `1` (atm SONET) or `2` (atm SDH).

Path Width
The type of the SONET path. The possible values are `sts1`, `sts3c`, `sts9c`, `sts12c`, `sts24c`, or `sts48c`. The default is `sts3c`.

Loopback
The current loopback status of the SONET interface. The possible status entries are as follows:

`None` - the interface is not in a loopback state (default value)

`Line` - the receive data and clock are connected to the transmit data and clock

`Diag` - the transmit data stream and clock are looped back to the receiver

`Other` - the interface is in a loopback that is not defined.

Tx Clock Source
The source of the transmit clock. The possible values are `Local` or `Rx`. The default is `Local`.

Rx Scrambling
Indicates whether the information is being descrambled on receiving. The possible values are `Descrambling` or `No Descrambling`. The default is `Descrambling`.

Tx Scrambling
Indicates whether the information is being descrambled before transmitting. The possible values are `Scrambling` or `No Scrambling`. The default is `Scrambling`.

Section Stat
The section status of the interface. The possible values are `1` (no defect), `2` (loss of signal detected), or `4` (loss of frame detected). The default is `1`.

Line Status
The line status of the interface. The possible values are `1` (no defect), `2` (line alarm indication signal detected), or `4` (line far end receive failure detected). The default is `1`.

Path Status
The path status of the interface. The possible values are `1` (no defect), `2` (path loss of pointer detected), `4` (path alarm indication signal detected), or `8` (path yellow alarm detected). The default is `1`.

Application Views

This section describes the Application views and the device-specific applications to which they provide access.

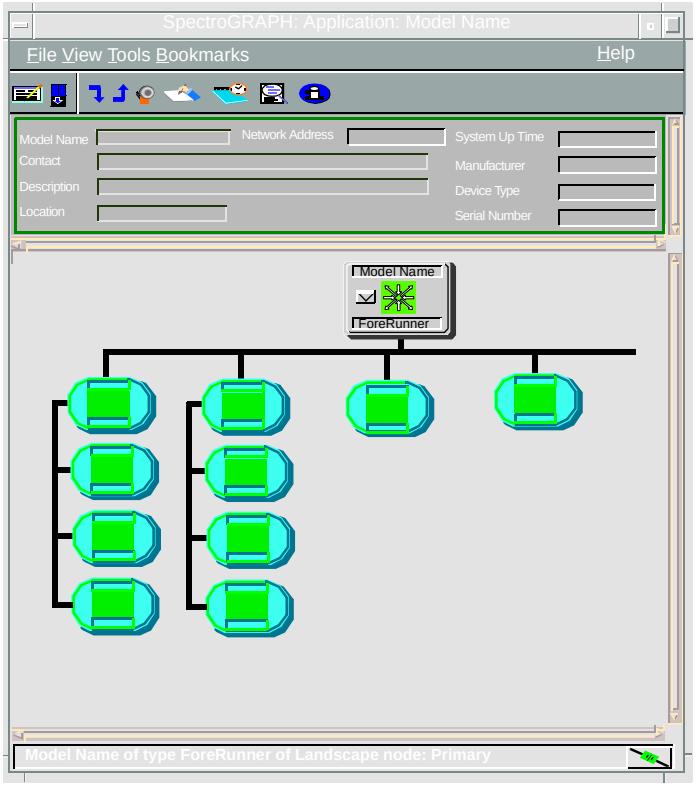
Access: *From the* ***Icon Subviews*** *menu for the Device icon, select* ***Application****.*

Main Application View

When a device model is created, SPECTRUM automatically creates models for each of the major and minor applications supported by the device. The main Application view identifies all of these application models, shows their current condition status, and provides access to application-specific subviews. Figure 11 shows this view in the Icon mode. If you prefer the List mode, which displays applications as text labels, select **View > Mode > List**.

For more information on this view, refer to ***MIBs and the Application View***.

Figure 11: Main Application View i



Supported Applications

SPECTRUM's applications can be grouped within two general categories as follows:

- Applications associated with non proprietary MIBs. See *Common Applications* below.
- Applications associated with device-specific MIBs. See *Device-Specific MIBs* (Page 49).

Common Applications

For the most part, these applications represent the non proprietary MIBs supported by your device. Listed below (beneath the title of the SPECTRUM document that describes them) are some of the common applications currently supported by SPECTRUM.

Note:

The documents listed below (in bold font) are available for viewing at:
www.aprisma.com/manuals/

- ***Routing Applications***
  - Generic Routing
  - Repeater
  - AppleTalk
  - DECnet
  - OSPF
  - OSPF2
  - BGP4
  - VRRP
  - RFC 2932
- ***Bridging Applications***
  - Ethernet Special Database
  - Spanning Tree
  - Static
  - Transparent
  - PPP Bridging
  - Source Routing
  - Translation
  - QBridge
- ***MIB II Applications***
  - SNMP
  - IP
  - ICMP
  - TCP
  - System2
  - UDP
- ***Transmission Applications***
  - FDDI
  - Point to Point
  - DS1
  - DS3

- RS-232
- WAN
- Frame Relay
- Token Ring
- Ethernet
- Fast Ethernet
- rfc1317App
- rfc1285App
- rfc1315App
- 802.11App
- SONET

- ***Technology Applications***
  - APPN
  - ATM Client
  - DHCP
  - DLSw
  - PNNI
  - RFC 1316App
  - RFC 1514
  - RFC 2287
  - RFC 2790
  - RFC 2925

- ***DOCSIS Applications***
  - DOCSISCblDvApp
  - DOCSISQOSApp
  - DOCSISBPI2App
  - DOCSISBPIApp
  - DOCSISIFApp

- ***Digital Subscriber Line (DSL) Applications***
  - ADSL

Device-Specific MIBs

SPECTRUM imports the following device-level proprietary MIBs into its database:

- fore-switch.mib
- fore-traplog.mib

These MIBs can be used in conjunction with SPECTRUM's optional customization products (referred to as the Level I Tool Kits) to create application models and views that display the condition of selected MIB objects.

Note: Aprisma Management Technologies can provide training, technical assistance, and custom engineering support services for creating application models and their associated views.

The following device-specific applications are described in the remainder of this section:

- *Fore Switch Application (ForeSwitchApp)* (Page 50)
- *Fore Software Application (ForeSoftWreApp)* (Page 69)
- *Fore Dual SCP Application (ForeDualSCPApp)* (Page 102)
- *Fore Shared Memory Network Application (ForeShMemApp)* (Page 103)
- *Fore Lane Application (ForeLaneApp)* (Page 103)
- *Fore ATM User Application (ForeUserApp)* (Page 107)

Fore Switch Application (ForeSwitchApp)

Table 18 describes the Icon Subviews menu selections for this application.

Table 18: ForeSwitchApp Icon Subviews Menu

Menu Selection	Description
Configuration	Opens *ForeSwitchApp Port Configuration View* (Page 43).
Model Information	Opens the Model Information view described in ***SPECTRUM Views***.
Path	Opens the *Path Tables* (Page 51).
Channels	Opens the *Channels Tables* (Page 54).
Topology	Opens the *Topology Tables* (Page 55).
Signaling	Opens the *Signaling Tables* (Page 58).
Interfaces	Accesses the Performance view described in the ***SPECTRUM Views*** documentation.
ForeView	Accesses the separately purchased *ForeView Application* (Page 109), which is described in the FORE Systems, Inc., user documentation.

Some of the fields in the Path, Channels, Topology, and Signaling Tables views are used to set connection information. Changes to these tables affect the format of some of the fields in the tables listed below.

- Path - Originating, Through, and Terminating Tables
- Channels - In and Through Tables
- Topology - NSAP Admin Tables
- Signaling - SPANS Path and Q2931 Admin Tables

In order to change the fields in these tables, the Community Name field in the Communication Information panel of the Model Information view must be set to “private” or whatever the community name is for read/write privileges.

To create, change, or delete rows in the tables listed in the above paragraph, you must first select the row as follows:

1. Select the desired table from the Icon Subviews menu.
2. Set the path information for the row you wish to create, change, or delete.
3. Click **Enter** and then **OK**.

To create or change the row after selecting it, do the following:

1. Click **Create**.
2. Change the applicable fields in the change view.
3. Click the right mouse button and select **OK.**
4. Click **Validate Row** and click the right mouse button to return to the table view and see the change.

To remove the row after selecting it, do the following:

1. Click **Remove**.
2. Click **Update**. The row will be removed from the table view.

Path Tables

These tables contain Path information about the virtual paths originating from, terminating at, or passing through the device. The following tables are available:

- Originating Path Table
- Terminating Path Table
- Through Path Table

Originating Path Table

This table shows originating path status information and allows you to create and remove paths. Follow the procedure shown at the bottom of the table to create and remove paths. This table contains the following fields.

Port
The input port of this path.

VPI (Virtual Path Identifier)
The input VPI of this path.

Status
The status of this path entry.

Chan. Max
The maximum number of virtual channels that can be allocated on this path.

Chan. Alloc.
The number of virtual channels currently allocated on this path.

Band. Max
The maximum bandwidth of this path, in cells per second.

Band. Alloc.
The allocated bandwidth of this path, in cells per second.

Band. Used
The bandwidth used on this path, in cells per second.

Uptime
The time since this path was created.

Cells
The number of cells transferred over this path.

Protocol
The signaling protocol that created this path.

Terminating Path Table

This table shows terminating path status information and allows you to create and remove paths. Follow the procedure shown at the bottom of the table to create and remove paths. This table contains the following fields:

Port
The output port of this path.

VPI
The output VPI of this path.

Status
The status of this path entry.

VCs (Virtual Channels)
The VCs of this path.

Chan. Max
The maximum number of virtual channels that can be allocated on this path.

Chan. Alloc.
The number of channels currently allocated on this path.

Band. Max
The maximum bandwidth of this path, in cells per second.

Band. Alloc.
The allocated bandwidth of this path, in cells per second.

Band. Used
The bandwidth used on this path, in cells per second.

Uptime
The time since this path was created, in hundredths of a second.

Cells
The number of cells transferred over this path.

Protocol
The signaling protocol that created this path.

Through Path Table

This table shows through path status information and allows you to create and remove paths. Follow the procedure shown at the bottom of the table to create and remove paths. This table contains the following fields.

In Port
The input port of this path.

In VPI
The input VPI of this path.

Out Port
The output port of this path.

Out VPI
The output VPI of this path.

Status
The status of this path entry.

Band. Max
The maximum bandwidth of this path, in cells per second.

Band. Alloc.
The allocated bandwidth of this path, in cells per second.

Cells
The number of cells transferred over this path.

Uptime
The time since this path was created, in hundredths of a second.

Protocol
The signaling protocol that created this path.

Channels Tables

These tables contain channel information about the virtual paths coming in or passing through the device. The following tables are available.

- In Channels Table
- Through Channels Table

Input Channels Table

This table shows input path status information and allows you to create and remove paths. Follow the procedure shown at the bottom of the table to create and remove paths. This table contains the following fields.

Port
The input of this channel.

VPI
The input VPI of this channel.

VCI (Virtual Channel Identifier)
The input VCI of this channel.

Status
The status of this channel.

Ports Routed
The number of output ports to which this channel is routed.

Band. Alloc.
The allocated bandwidth on this channel, in cells per second.

Band. Used
The bandwidth used on this channel, in cells per second.

Uptime
The time since this channel was created, in hundredths of a second.

Protocol
The signaling protocol that created this path.

Cells
The number of cells transferred over this channel.

Rejected Cells
The number of cells discarded on this channel.

CDV
Cell Delay Variation tolerance, in microseconds.

Policing Action
The action the device will take when there is a bandwidth violation on this channel.

Output Channels Table

This table shows output path status information and allows you to create and remove paths. Follow the procedure shown at the bottom of the table to create and remove paths. This table contains the following fields.

In Port
The input port of this path.

In VPI
The input VPI of this path.

In VCI
The input VCI of this channel.

Out Port
The output port of this path.

Out VPI
The output VPI of this path.

Out VCI
The output VCI of this channel.

Status
The status of this path entry.

Protocol
The signaling protocol that created this path.

Topology Tables

These tables provide link topology information. The following link and Network Services Access Point (NSAP) tables are available:

- Links Table
- Switch Cluster Table
- Switch Board Links/Topology Table
- NSAP Network Prefix Table
- NSAP Admin Table
- NSAP Topology Table

Links Table

This table contains the following fields.

Number of Links
The current number of links known by the switch.

Source
The ATM address of the source switch.

Destination
The ATM address of the destination switch.

Capacity
The free capacity of this link, in kilobits per second.

Age
The age of this link information. The actual value has meaning only for comparing different links.

Switch Cluster Table

This table contains the following fields.

Index
The index number of the switch board within the ATM switch cluster.

Max Paths
The maximum number of input VPIs on this switch board.

Max Channel
The maximum number of input VCIs on this switch board.

ATM Address
The address of this ATM switch board.

Uptime
The length of time this switch board has been up, in hundredths of a second.

CDV (Cell Delay Variation)
The switch board CDV, specified in microseconds. This indicates the time window in which a cell may be received on a connection and be accepted.

Policing Act
The action the switch board will take in case of a bandwidth violation.

Switch Board Links/Topology Table

This table contains the following fields:

Index
The index of this switch board within the ATM switch cluster.

Source
The ATM address of the source switch of this link.

Destination
The ATM address of the destination switch of this link.

Capacity
The free capacity of this link, in kilobits per second.

Age
The age of this link information. The actual value has meaning only for comparing different links.

Inter-Switch Links
The number of inter-switch links for this ATM switch.

NSAP Network Prefix Table

This table contains the following fields:

Port
The port of this signaling path, which is the same as the NSAP port.

VPI
The VPI of this signaling path statistics entry.

NSAP Prefix
The network prefix used for ATM addresses that is in effect on the user side of the ATM UNI (User Network Interface) port.

Status
The status of this Network Prefix entry. Setting this field to “invalid” causes this network to disappear.

NSAP Admin Table

This table contains the following fields:

Address
Identifies the NSAP.

Mask
Identifies the mask that is used for this NSAP.

Port
Identifies the port that this NSAP can be reached on.

VPI
Identifies the path that this NSAP can be reached on.

State
Identifies the state of this NSAP: (1) in use, (2) idle.

Status
The status of this NSAP address. Setting this object to invalid causes this NSAP address to disappear.

NSAP Topology Table

This table contains the following fields:

Board
The switch board within the ATM switch cluster.

Source
Identifies the source NSAP address of this link.

Source Mask
Identifies the mask that is used for the link source NSAP address.

Source Port
Identifies the port that is used for the link source NSAP address.

Destination
Identifies the destination NSAP address of this link.

Dest. Mask
Identifies the mask that is used for the link destination NSAP address.

Dest. Port
Identifies the port that is used for the link destination NSAP address.

Cost
The routing metric for this link.

CBR (Constant Bit Rate) Capacity
The available capacity for additional CBR connections, in kilobits per second.

CBR FIFO (First In First Out)
The size of the FIFO queue that is used for transmitting CBR traffic, in cells.

VBR (Variable Bit Rate) Capacity
The available capacity for additional VBR connections, in kilobits per second.

VBR FIFO
The size of the FIFO queue that is used for transmitting VBR traffic, in cells.

Link Source
The source of this route information.

Capabilities
The bitmap indication of the capabilities of this link.

UBR (Unspecified Bit Rate) VCs
The number of active UBR VCs over this link.

Freshness
The freshness (or staleness) of this NSAP link.

Signaling Tables

The following signaling information tables are provided:

- SPANS Path Table
- SPANS Status Table
- SPANS Smart PVCs Source Table
- SPANS Smart PVCs Destination Table
- Q2931 Admin Table
  - Q2931 Statistics Table

SPANS Path Table

This table contains the following fields:

Port
The port of this signaling path.

VPI
The VPI of this signaling path.

VCI
The VCI of the signaling channel within the signaling path.

Connectionless VCI
The VCI of the connectionless channel within the signaling path.

Admin Status
The desired state of this signaling channel.

Operational
The current operational state of this signaling channel.

Status
The status of this signaling path entry.

AAL (ATM Adaptation Layer) Type
The AAL type that is used by this Q2931 signaling path.

CDV (Cell Delay Variation)
The switch board CDV, specified in microseconds. This indicates the time window in which a cell may be received on a connection and be accepted. A cell that is received on a connections outside the CDV window will be tagged or dropped as indicated by the board Policing Action.

Policing Action
The Policing Action indicates the action the switch board will take in case of a bandwidth violation.

Remote ATM
The ATM address of the entity connected to this port.

Remote IP
The IP address of the entity connected to this port.

Type
The type of the signaling path connection. UNI (User Network Interface) means that there is a workstation on the remote side. NNI (Network Network Interface) means there is another switch that communicates using SPANS on the remote side.

SPANS Status Table

This table contains the following fields:

Port
The port of this signaling path.

VPI
The VPI of this signaling path.

VCC (Virtual Channel Connections)
The number of VCCs on this signaling path.

Restarts
The number of times the switch has lost and regained contact.

Completions
The number of completed calls for this signaling path.

Failures
The number of call failures for this signaling path.

Rejections
The number of rejections for this signaling path.

Transmitted Messages
The number of transmitted messages over this signaling path.

Received Messages
The number of received messages over this signaling path.

Connectionless Transmitted
The number of connectionless transmitted messages over this signaling path.

Connectionless Received
The number of connectionless received messages over this signaling path.

SPANS Smart PVCs Source Table

This table contains the following fields:

Id
The identifier for the SPVC for which this switch is the source.

ATM Address
The ATM address of the source switch.

Destination Id
The identifier of the destination switch.

Destination
The ATM address of the destination switch.

In Port
The input port of this SPVC.

In VPI
The input VPI of this SPVC.

In VCI
The input VCI of this SPVC.

Alloc BW
The allocated bandwidth of this SPVC.

Uptime
The time since this SPVC was created, in hundredths of a second.

Status
The status of this SPVC.

Entry Status
The status of this SPVC entry.

SPANS Smart PVCs Destination Table

This table contains the following fields:

Id
The SPVC identifier at the source switch.

ATM Address
The ATM address of this switch.

Source Id
The SPVC identifier at the source switch.

Source
The ATM address of the source switch of this SPVC.

Out Port
The output port of this SPVC.

Out VPI
The output VPI of this SPVC.

Out VCI
The output VCI of this SPVC.

Alloc BW
The allocated bandwidth of this SPVC, in cells per second.

Uptime
The time since this SPVC was created, in hundredths of a second.

Status
The status of this SPVC.

Entry Status
The status of this SPVC entry.

Q2931 Admin Table View

This table contains the following fields.

Port
The port for this signaling path.

VPI
The VPI of this signaling path.

VCI
The VCI of this signaling channel within this signaling path.

Admin Status
The desired state of this signaling channel.

Operational
The current operational state of this signaling channel.

SSCOP Oper Stat
The current operational state of the underlying SSCOP on this channel. SSCOP's function is to

provide a reliable data link layer for the exchange of Q2931 signaling messages.

ILMI Admin Stat
The desired state of the underlying ILMI status and configuration channel.

ILMI Oper Status
The current operational state of the underlying ILMI status and configuration channel.

AAL (ATM Adaptation Layer) Type
The AAL type that is used by this Q2931 signaling path.

UNI Side
Determines the role this port takes in the UNI. If this port is connected to a host using the private UNI, it is on the network. If this port is connected to the public UNI, this port may be required to be the user.

Config Type
The configuration of the UNI at initialization. Configuring the UNI to publicUNI means that this link will be used between the switch and a public switch. Configuring the UNI to auto means that the operational type will be determined dynamically. Configuring the UNI to phaseONNI indicates that this link is used for static routing.

Oper Type
The operational configuration of the UNI. PublicUNI is used between the switch and a public switch. PrivateUNI is used between the switch and a host. PhaseONNI is used between two switches using static routing. PhaseSpansNNI is used between two switches using SPANS mapping messages for dynamic routing. If the Q2931AdminConfigType is set to `auto`, the value of this object may be either privateUNI or phaseSpansNNI.

Remote IP
The IP address of the entity connected to this port.

Entry Stat
The status of this path entry.

Q2931 Administration Table Detail View

Access: *Within the **Q2913 Administration Table View**, double-click on any field entry.*

ILMI Admin VCI
The VCI of the ILMI signaling channel.

Admin Min VCI
The minimum configured VCI used for SVCs.

Admin Max VCI
The maximum configured VCI used for SVCs.

Min VCI
The minimum actual VCI used for SVCs

Max VCI
The maximum actual VCI used for SVCs.

Rem IP Address
The remote IP address

Calling P deflt Addr
The calling party address to be inserted in Connection Setup messages which do not contain Calling Party Addresses.

Native E164 Address
The Native E164 Address for this uni.

Use Native E164
Whether to use Native Form of E164 Addresses across this link. Used by public UNI. Possible options are `enable` or `disable`.

E164 Addr Resolution
Whether to resolve Private NSAPs into Native E164 addresses. If disabled, but if Use Native E164 is enabled, then the only address conversion performed at this UNI will be of Private NSAPs in E.164 format.

UNI Config Version
The configuration version of the UNI protocol to use at initialization. Configuring the UNI to `auto`, means that the UNI will attempt to automatically determine which version of the UNI protocol to use by reading the value of ILMI variable UNI version. Configuring to uni30 means that this link will use version 30 of the UNI protocol, likewise for uni31. If the nni interface has to be brought up as pnni then pnni10 version is specified.

UNI Oper Version
The version of the UNI that is currently being used on this link. Possible version are auto, uni30, uni31, pnni10, and uni40.

Ft Pnni Orig Cost
The cost of each pnni orig loglink. It is configured at originating end of sigPath.

Ft Pnni Term Cost
The cost of each pnni term loglink. The originating side of a link informs the terminating side of the configured Ft Pnni Orig Cost in a hello message. The terminating side then uses the cost value in the hello message as the Pnni Term Cost for topology advertisement.

Sig Mode
The configured mode for signaling: VP-associated, Non-Associated or auto mode. vpAssoc stands for

VP-associated signaling, if set to this value, the uni encodes the connection identifier with the VP-associated signaling bits. nonAssoc is for Non-associated signaling, if set to this value the connection identifier is encoded with non-associated signaling bits. auto stands for aut-configured signaling mode. If set to this value, the operating mode will be determined dynamically and will either be VP-associated or Non-associated depending on the operating type of this signaling link.

Sig Alloc
The current configured allocation policy for a network side uni. If set to allocVP, the signaling entity will allocate connections within the containing VP only. If set to allocLink, the signaling entity will allocate connections in its containing VP and may allocate connections in others VPS that are available to it. If set to allocVpBundle, the uni will allocate connections in its containing VP and a bundle of other VPs which are pre-created. If set to auto, the operating allocation policy will be determined based on the operating type of the signaling entity and the VPI value of the VP in which the signaling channel is present. Based on these, it might be allocLink or allocVP or allocVpBundle.

Peer Port
The value of this object identifies the port of the peer's signaling path. The value starts at zero.

Input Sig Contract
The Traffic Contract to be applied to the input signaling channel.

SCOP NoResp Timer
The value to be set for the duration of the SSCOP No response timer. This is the time in seconds that we will wait before bringing the SSCOP link down. If no value is specified by the user, a default value of 10 seconds is used if the oper version is uni30 and a default value of 7 seconds is used if the oper version is uni31.

QOS Class Exp Key
The key for the QoS Class Expansion Table to be used for this UNI.

ATMR Conf Domain ID
The ID of the routing domain to which this interface belongs if this uni is operating as a private uni, public uni or IISP.

Oper Sig Mode
The operating mode for signaling: VP-associated or Non-associated. vpAssoc stands for VP-associated signaling, if set to this value, the uni encodes the conn_id with the VP-associated signaling bits. nonAssoc stands for non-

associated signaling. If set to this value, the uni encodes the conn_id with Non-associated signaling bits.

Oper Sig Alloc
The operating allocation policy for a network side uni. If set to allocVP, the network side uni will allocate connections in its containing VP only. If set to allocLink, the uni will allocate connections in its containing VP and may allocate connections in other VPS that are available to it. If set to allocVpBundle, the uni will allocate connections it its containing VP and a bundle of other VPs which are pre-created.

Output Sig Upc
The Traffic Contract to be applied to the output side of the signaling channel. If this is not specified, signaling will be put in the vbr queue with no bandwidth reservation and no policing.

Plan Type
The plan type to be used in calling party number and called party number IEs in the signaling messages. The value of this is dependent on whether Use NativeE164 is set to enable or disable. When Use Native E164 is set to disable, Plant Type take a default value of `unknown`. All other values are invalid. When Use Native E164 is set to enable, Plan Type takes a default value of `international`. Other valid values are `national` and `subscriber`.

Last Change Time
The time the Signaling entity was created in hundredths of a second.

In NSAP Filt Index
The Filter Index of the NSAP Address Filter used to filter incoming calls. If this variable is set to zero, all incoming calls on this UNI will be accepted.

Out NSAP Filt Index
The Filter Index of the NSAP Address Filter used to filter outgoing calls. If this variable is set to zero, all incoming calls on this UNI will be accepted.

IE Filter
Information Element Filtering Interface Options.

Additional detail

Opens the Q2931 Administration Table Additional Detail View.

Q2931 Administration Table Additional Detail View

Access: *From the **Software Switch Configuration View**, click the **Q2931 Admin** button.*

Max VPI
The maximum configured VPI that is used for SPVs when this interface sets up SPV Connections and also the Max VPI that is used to create dynamic paths for SVCs connections.

Max Svcc VPI
The maximum actual VPI that will be used for SVCs dynamic paths. This variable denotes the operating value for the maximum VPI value that can be used for setting up dynamic path SPVs. The operating value can differ from the configured value (Max VPI) as the operating value depends on the outcome of possible ILMI based VPI range negotiation procedure.

Max Svpc VPI
The maximum actual VPI that will be used for SVPs. This variable denotes the operating value for the maximum VPI value that can be used for setting up dynamic path SVPS. The operating value can differ from the configured value (Max VPI) as the operating value depends on the outcome of possible ILMI based VPI range negotiation procedure.

Vp Capability
Used to determine if this interface is capable of supporting Switched Vps. For UNI3.x and VP Scope Signaling Interfaces SVPs cannot be created and hence undefined. For UNI40 & PNNI Link Scope interfaces, if there is a non-zero VPI range intersection with the peer, the interface is vpCapable. If not it is notVpCapable.

NNI Proto
The NNI protocol being run on this link. Possible options are `none`, `ftpnni`, `forum-pnni`, and `iisp`.

Accelerated Clear
Indicates whether to clear calls when carrier is lost on the link associated with this signaling channel or the Virtual Path goes down. The default value is noClear. This follows the ATM forum specification which requires the specific signaling timers to expire before clearing the connections. Setting this value to clearCalls will result in the connections being torn down as soon as carrier loss/VP failure is detected (not compliant with ATM Forum signaling specifications).

Vpci Group Index
The index into the VPCI Mapping Group Table to use for this signaling interface.

Supplem Services Status
The supplement services status.

Calling PAddress Presentation
The Calling party address presentation can be set to one of the two values as described above. This is used when this interface is acting as a calling party of a call setup message. When set to enable, while a call setup message is forwarded through this interface, the calling party number is provided. When set to disable, the calling party number is not provided in the call setup message. The value of undefined is a read-only value used for interfaces where supplementary services are not applicable.

Calling PAddress Restriction
The Calling party address restriction can be set to one of the two values as described previously. This variable is used when this interface is acting as a calling party for a call setup message. When set to `enable`, while a call setup message is received from this interface and forwarded out, the calling party number is not provided to called user. When set to `disable`, the calling party number is provided to the called user. The value of `undefined` is a read-only value used for interfaces where supplementary services are not applicable.

ConnectedPAddressPresentation
The Connected party address presentation can be set to one of the two values as described previously. Tis variable is used when the interface is acting as a calling party to a call setup message. When set to enable, while a call establishment response message is forwarded through this interface, the connected party number is provided to the calling user. When set to disable, while a call establishment response message is forwarded through this interface, the connected party number is not provided to the calling user. The value of undefined is a read-only value used for interfaces where supplementary services are not applicable.

ConnectedPAddressRestriction
The Connected party address restriction can be set to one of the two values as described above. This variable is used when the interface is acting as a called party to a call setup message. When set to enable, while a call establishment response message is forwarded from this interface, the connected party number is not provided to the calling user. When set to disable, while a call establishment response message is forwarded from this interface, the connected party number is provided to the calling user. The value of undefined is a read-only value used for interfaces where supplementary services are not applicable.

ConnectedPDefaultAddress
The connected party address to be used in Connection Acceptance messages that do not contain Connected party addresses.

SubaddressingAdminStatus
Allows you to enable or disable the sub-addressing capability. If this is set to enable, the called party sub-address IE is passed along. If this is set to disable, this IE is removed while forwarding the messages. The value of undefined is a read-only value used for interfaces where supplementary services are not applicable.

UserUserSignallingAdminStatus
Used to enable or disable the User to User Signaling capability. If this is set to enable, the UUS IE is passed along. If this is set to disable, this IE is removed while forwarding the messages. The value of undefined is a read-only value used for interfaces where supplementary services are not applicable.

PnniRccVci
Used to specify the PVC RCC VCI used by the PNNI. Normally this will always be 18, but if a user creates a VPT with a VCI range that does not contain 18, then this field is used to specify the PNNI PVC RCC VCI.

Q2931 Statistics Table View

Access: *Within the **Software Switch Configuration view**, click the **Q2931 Stats** button.*

This table contains the following fields.

Port
The port for this signaling path.

VPI
The VPI of this signaling path.

VCC (Virtual Channel Connections)
The VCC of this signaling path.

Restarts
The number of times this switch has lost and regained contact with the remote signaling entity on this path.

Call Completions
The number of successful call completions for this signaling path.

Call Failures
The number of call failures for this signaling path.

Call Rejections
The number of connections on this path that were rejected by the far end.

Messages Trans.
The number of transmitted messages over this signaling path.

Messages Rec.
The number of received messages on this signaling path.

Q2931 Statistics Detail View

Access: *Within the Q2931 Statistics View, double-click any field entry to open this view.*

This view contains pie charts which display Q2931 Call and Message information as well as the following fields.

Port. PVI
Identifies the VPI of this signaling path.

VCCs
The number of VCCs on this signaling path.

Restarts
The number of times the switch has lost and regained contact with the remote signaling entity on this path.

Note: All other enterprise specific applications are provided by the Fore Software Application (ForeSoftWreApp), which is managed by the device.

Fore Software Application (ForeSoftWreApp)

The ForeSoftWreApp gives access to the software branch of the switch-mib. It provides the following enterprise specific application models:

- *Fore Dual SCP Application (ForeDualSCPApp)* (Page 102)
- *Fore Shared Memory Network Application (ForeShMemApp)* (Page 103)
- *Fore Lane Application (ForeLaneApp)* (Page 103)
- *Fore ATM SONET Application Configuration View* (Page 45)

Software Switch Configuration View

Access: *From the **Icon Subviews** menu for the ForeSoftWreApp icon, select **Configuration**.*

Switch Type
The type of ATM switch.

Hardware Version
The version of the ATM switch hardware in hex. The version number 0x1 is revision A, 0x2 is revision B etc. Version number 0x0 represents an unknown type.

Software Version
The version of the ATM switch control software in hex. The version number is encoded into 6 hex digits. For example, version 1.2.3 is encoded as 0x010203.

Max Input VPIs
The maximum number of input VPIs (Virtual Path Identities).

Max Input VCIs
The maximum number of input VCIs (Virtual Path Identifiers).

Reserved PMP Min VCI
The minimum VCI that is reserved for PMP connections.

Reserved PMP Max VCI
The maximum VCI that is reserved for PMP connections.

ATM Address
The address of this ATM switch.

Switch Uptime
The length of time this ATM switch has been up, in hundredths of a second.

Version (Text)
The version of the ATM switch control software. This object provides text information about the internal software configuration that was used when the switch control software was built.

Update Transfer Protoco
The update transfer protocol.

Current User Id
The current user identification.

Current Login From
The site currently logged in from.

Port Group

Opens the *ATM Switch Software Port Table View* (Page 71).

Path In

Opens the *Paths In Table View* (Page 81).

Path Out

Opens the *Paths Out Table View* (Page 82).

Path Route

Opens the *ATM Switch Path Route Table View* (Page 83).

Signaling

Opens the *Signaling Path Table View* (Page 83).

Topology

Opens the *Topology Configuration View* (Page 84).

Q2931 Stats

Opens the *Q2931 Statistics Table View* (Page 68).

Q2931 Admin

Opens the *Q2931 Admin Table View* (Page 61).

PNNI SPVC Config

Opens the *PNNI SPVC/SPVPC Configuration View* (Page 88).

NSAP Static Route

Opens the *NSAP Static Route Table View* (Page 101).

Additional Config

Opens the Software Switch Additional Configuration View.

ATM Switch Software Port Table View

Access: *From the Software Switch Configuration view, click on the Port Group button.*

Index
The unique identifier of this port row.

Board
The board number of this port.

Module
The module number of this port.

Name
The name of the port.

Admin
The desired state of the port. The up state indicates that SPANS (Simple Protocol for ATM Network Signaling), FORE's link signaling protocol, is used to determine the operational status of the port. The down state dictates that the

operational status of the port should not be determined by SPANS.

Oper
The current operational state of this port, as determined either by administrative action, when the value of Admin is `down`, or by SPANS when the value of Admin is `up`.

TIme
The length of time this port has been in its current state, in hundredths of a second.

Remote ATM
The ATM address of the entity connected to this port.

Remote IP
The IP address of the entity connected to this port.

ATM Switch Software Port Detail View

Access: *Double-click on any entry in the ATM Switch Software Port View.*

Port Number
The hardware port number of this port. For a control port (software port), the value of this object is 0.

Name
The name of this port.

Board
The hardware board number of this port.

Module
The hardware module number of this port. For a control port (software port), the value of this object is the maximum number of hardware modules plus one.

Admin Status
The desired state of this port. The `up` state indicates that SPANS, FORE's link signaling protocol, is used to determine the operational status of the port. The `down` state dictates that the operational status of the port should not be determined by SPANS.

Oper Status
The current operational state of this port, as determined either by administrative action, when the value of Admin Status is down, or by SPANS, when the value of Admin Status is up. For RRAM netmod, it is equivalent to the Oper Status of the same port.

Time
The length of time this port has been in its current state, in hundredths of a second.

CDV Tolerance
The Cell Delay Variation (CDV) tolerance associated with this physical port. Connections take their default value for tis from the input side port.

Remote ATM Address
The ATM address of the entity connected to this port.

Remote IP Address
The IP address of the entity connected to this port.

ILMI Remote IP Address
The IP address of the entity connected to this port that was discovered using ILMI on path 0. If there is no q2931 signaling path on VPI 0 that uses ILMI, the value of this object is `255.255.255.255`.

Max Paths In
The maximum number of incoming virtual paths supported by this port.

Num Paths In
The number of incoming virtual paths on this port.

Max Paths Out
The maximum number of outgoing virtual paths supported by this port.

Num Paths Out
The number of outgoing virtual paths on this port.

Input CDV
The current value of Cell Delay Variation attributed to the input side of this port, which can be either a user specified value or the system default, as determined by the setting of InputCDVmode.

Input Max CTD
This variable gives the maximum Cell Transfer Delay that is being attributed to the input side of this port. The value can be either user specified or a hardware dependent system default value.

Output CDV
If the port out put delay mode equals userSpecified then this variable contains the constant amount of Cell Delay Variation that is being attributed to this output port. If portOutputDelay mode equals systemDefault then an actual value for the CDV experienced by connections traversing this port is being calculated. In this case the value of this variable is meaningless since CDV can only be calculated on a per-connection basis.

Output Max CTD
This variable gives the maximum Cell Transfer Delay that is being attributed to the output side of the port. The value can be either user specified or a hardware dependent system default value.

Management Status
The visibility of this port in the management station's view. The default value is 1.

AIS RDI Generation
The port ATM layer AIS and Receiver Data Interface (RDI) generation status, either `enabled` or `disabled`.

Paths of this Port

Opens the *Paths of Selected Port View* (Page 74).

Additional Detail

Opens the *Additional Detail View* (Page 75).

Port Performance

Opens the Port Performance View.

Path Routes of this Port

Opens the *Path Routes of Selected Port View* (Page 79).

Channel Routes of this Port

Opens the *Channel Routes of Selected Port View* (Page 81).

Paths of Selected Port View

Access: *Within the **ATM Switch Software Port Detail View**, click the **Paths of this Port** button.*

Path Table
A table of information about the virtual paths passing through this ATM switch.

In Port
The input port of this path.

In VPI
The input VPI of this path.

Status
The status of this path entry.

NumOutputs
The number of output ports to which this path is routed.

MaxChans
The maximum number of virtual channels that can be allocated on this path.

NumChans
The number of virtual channels currently allocated on this path.

Max B/W
The maximum bandwidth of this path, in cells per second.

Allc B/W
The allocated bandwidth of this path, in cells per second.

Cells
The number of cells transferred over this path.

Uptime
The time since this path was created, in hundredths of a second.

Protocol
The signaling protocol that created this path.

Additional Detail View

Access: *Within the **ATM Switch Software Port Detail View**, click the **Additional Detail** button.*

Port Number
The hardware port number of this port. For a control port (software port), the value of this object is 0.

Name
The name of this port.

Board
The hardware board number of this port.

Module
The hardware module number of this port. For a control port (software port), the value of this object is the maximum number of hardware modules plus one.

PP Policing CBR
This variable defines the per-port policing configuration for CBR connections. The states are defined in Table 19.

Table 19: Policing CBR States

State	Definition
allOn	All CBR connections arriving on this port will be subjected to GCRA policing.
allOff	No CBR connections arriving on this port will be subjected to GCRA policing.
svcOn	All CBR SVCs arriving on this port will be subjected to GCRA policing.
svcOff	No CBR SVCs arriving on this port will be subjected to GCRA policing. CBR PVCs will be GCRA policed based on the state of their UPC contract.

PP Policing VBR
This variable defines the per-port policing configuration for nrtVBR connections. The states are defined in Table 20.

Table 20: AAL5 nrtVBR States

State	Definition
allOn	All nrtVBR connections arriving on this port will be subjected to GCRA policing.
allOff	No nrtVBR connections arriving on this port will be subjected to GCRA policing.
svcOn	All nrtVBR SVCs arriving on this port will be subjected to GCRA policing.
svcOff	No nrtVBR SVCs arriving on this port will be subjected to GCRA policing. CBR PVCs will be GCRA policed based on the state of their UPC contract.

GCRA Policing CBR

This variable defines the per-port policing configuration for CBR connections. The states are defined in Table 21.

Table 21: CBR Connections

State	Definition
allOn	All CBR connections arriving on this port will be subjected to GCRA policing.
allOff	No CBR connections arriving on this port will be subjected to GCRA policing.
svcOn	All CBR SVCs arriving on this port will be subjected to GCRA policing.
svcOff	No CBR SVCs arriving on this port will be subjected to GCRA policing. CBR PVC will be GCRA policed based on the state of their UPC contract.s
default	All CBR UNI SVCs/SVPs arriving at this port will be subject to GCRA policing and no CBR NNI SBCs/SVPs arriving at this port will be subject to GCRA policing. CBR PVCs/PVPs arriving at this port will be policed based on the state of their UPC contract.

GCRA Policing VBR

This variable defines the per-port policing configuration for nrtVBR connections. The states are defined in Table 22.

Table 22: GCRA Policing VBR States

State	Definition
allOn	All nrtVBR connections arriving on this port will be subjected to GCRA policing.
allOff	No nrtVBR connections arriving on this port will be subjected to GCRA policing.
svcOn	All nrtVBR SVCs arriving on this port will be subjected to GCRA policing.
svcOff	No srtVBR SVCs arriving on this port will be subjected to GCRA policing. nrtVBR PVCs will be GCRA policed based on the state of their UPC contract.
default	All nrtVBR UNI SVCs/SVPs arriving at this port will be subject to GCRA policing and no nrtVBR NNI SVCs/SVPs arriving at this port will be subject to this. nrtVBR PVCs/PVPs arriving at this port will be policed based on the state of their UPC contract.

AAL5 Packet Discard CBR

This variable defines the per-port AAL5 packet discard configuration for CBR connections. The states are defined in Table 23.

Table 23: AAL5 CBR States

State	Definition
allOn	All CBR AAL5 connections have packet discard performed on them.
allOff	AAL5 packet discard is not performed on any CBR connections.
svcOn	Any CBR SVC that requests packet discard will have it performed. For CBR PVC's, AAL5 packet discard is enabled based on the UPC contract of the connection.
svcOff	AAL5 packet discard is not performed on any CBR SVCs. For CBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection.

AAL5 Packet Discard VBR

The variable defines the per-port AAL5 packet discard configuration for nrtVBR connections. The states are defined in Table 24.

Table 24: AAL5 nrtVBR States

State	Definition
allOn	All nrtVBR AAL5 connections have packet discard performed on them.
allOff	AAL5 packet discard is not performed on any nrtVBR connections.
svcOn	Any nrtVBR SVC that requests packet discard will have it performed. For nrtVBR PVC's, AAL5 packet discard is enabled based on the UPC contract of the connection.
svcOff	AAL5 packet discard is not performed on any CBR SVCs. For nrtVBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection.

AAL5 Packet Discard UBR

The variable defines the per-port AAL5 packet discard configuration for nrtVBR connections. The states are defined in Table 25.

Table 25: AAL5 UBR States

State	Definition
allOn	All UBR AAL5 connections have packet discard performed on them.
allOff	AAL5 packet discard is not performed on any UBR connections.
svcOn	Any UBR SVC that requests packet discard will have it performed. For UBR PVC's, AAL5 packet discard is enabled based on the UPC contract of the connection.
svcOff	AAL5 packet discard is not performed on any CBR SVCs. For UBR PVCs, AAL5 packet discard is enabled based on the UPC contract of the connection.

UBR Taggin

This variable defines the per-port configuration for tagging (setting CLP=1) of all cells on UBR connections. The states are defined in Table 26.

Table 26: UBR Connection Tagging States

State	Definition
allOn	All UBR connections will be tagged.
allOff	No UBR connections will be subject to tagging.
svcOn	All UBR SVC's will be tagged. UBR PVC's will be tagged based on their UPC contract.
svcOff	No UBR SVC's will be tagged. UBR PVCs will be tagged based on their UPC contract.

Input Delay Mode

Allows you to control whether the Cell Delay Variation and Maximum Cell Transfer Delay values attributed to the input side of this port are based on a user defined value of the hardware dependent system default values. Options are `systemDefault` or `userSpecified`.

Output Delay Mode

Allows you to control whether the Cell Delay Variation value contributed by the input side of this port is based on a user defined value or the system default value.

CAC Status

The enforcement state of call admission control, either `enabled` or `disabled`. The default is enabled.

Path Routes of Selected Port View

Access: *Within the **ATM Switch Software Port Detail View**, click the **Path Routes of this Port** button.*

Path Route Table

A table of information about the routing of paths through this ATM switch.

In Port

Identifies the input port of this path and is the same as the port number.

In VPI

The input VPI of this path.

Out Port

The output port of this path.

Out VPI

The output VPI of this path.

Status
The status of this path entry.

NumOutputs
The number of output ports to which this path is routed.

MaxChans
The maximum number of virtual channels that can be allocated on this path.

NumChans
The number of virtual channels currently allocated on this path.

Max B/W
The maximum bandwidth of this path, in cells per second.

Alloc B/W
The allocated bandwidth of this path, in cells per second.

Cells
The number of cells transferred over this path.

Uptime
The time since this path was created, in hundredths of a second.

Protocol
The signaling protocol that created this path.

Rejected
The number of cells over this through path that were rejected (dropped) by the policer on the switch fabric. This does not include any cells that may have been tagged with CLP=1 by the policer, only cells that were discarded.

LoopVPI
If this value is other than -1, cells destined for pathrOutput, pathrOUtputVPI will be translated by the netmod to pathrLoopVPI before actually being transmitted. This was instituted to facilitate single port loopback.

UPCcontr
The UPC contract that will be used to police this through path. This is the number of the row in the Contract Table.

Name
The name that has been assigned for this path.

ConnType
The type of the path endpoints with respect to a particular network.

Channel Routes of Selected Port View

Access: *Within the **ATM Switch Software Port Detail View**, click the **Channel Routes of this Port** button.*

Information about the routing of channels through this ATM switch.

In Port
Identifies the input port of this channel and is the same as the chanPort, pathPort, and portNumber.

In VPI
The input VPI of this channel and is the same as the chanVPI, and pathVPI.

In VCI
The input VCI of this channel, it is the same as chanVCI.

Out Port
The output port of this channel. It is the same as the opathPort, and the portNumber.

Out VPI
The output VPI of this channel. It is the same as the opathVPI.

Out VCI
The output VCI of this channel.

Status
The status of this channel entry.

Protocol
The signaling protocol that created this channel.

Name
The name that has been assigned for this channel.

ConnType
The type of channel endpoints with respect to a particular network.

Paths In Table View

Access: *From the **Software Switch Configuration view**, click on the **Paths In** button.*

In Port
Identifies the input port of this path.

In VPI
The input VPI of this path.

Status
The status of this path entry.

NumOutputs
The number of output ports to which this path is routed.

MaxChans
The maximum number of virtual channels that can be allocated on this path.

NumChans
The number of virtual channels currently allocated on this path.

Max B/W
The maximum incoming bandwidth of this path, in cells per second.

Allc B/W
The allocated incoming bandwidth of this path, in cells per second.

Cells
The number of cells transferred over this path.

Uptime
The time since this path was created, in hundredths of a second.

Protocol
The signaling protocol that created the path.

Paths Out Table View

Access: *From the **Software Switch Configuration view**, click on the **Paths Out** button.*

Out Port
Identifies the output port of this path.

Out VPI
The VPI of this path.

MaxChans
The maximum number of virtual channels that can be allocated on this path.

NumChans
The number of virtual channels currently allocated on this path.

Max B/W
The maximum bandwidth of this path, in cells per second.

Alloc B/W
The allocated bandwidth of this path, in cells per second.

Cells
The number of cells transmitted on this path.

Uptime
The time since this path was created, in hundredths of a second.

Protocol
The signaling protocol that created this path.

TrShapeVPI
The VPI of shaped cells.

Min VCI
The minimum VCI that can be allocated on this path.

Max VCI
The maximum VCI that can be allocated on this path.

ATM Switch Path Route Table View

Access: *From the Software Switch Configuration view, click on the Path Route button.*

Signaling Path Table View

Port
Identifies the port of this signaling path, and is the same as the portNumber.

VPI
The VPI (Virtual Path Identifier) of this signaling path.

VCI
The VCI (Virtual Channel Identifier) of the signaling channel within the signaling path.

CLS-VCI
The VCI of the connectionless channel within the signaling path.

Admin
The desired state of this signaling channel. The up state dictates that SPANS (Simple Protocol for ATM Network Signalling) messages are used for signalling. The down state dictates the SPANS protocol is not used for signaling.

Oper
The current operational state of this signaling channel, as determined either by administrative action, when the value of a Admin is `down`, or by a link monitoring protocol, when the value of Admin is `up`.

Status
The status of this signaling path entry.

AALtype
The AAL (ATM Adaptation Layer) type that is used by this signaling path.

CDV
The signaling path Cell Delay Variation (CDV) specified in microseconds, indicates the time

window in which a cell may be received on a signaling channel and accepted. A cell that is received on a channel outside the CDV window will be dropped. The signaling path CDV value overrides the default value of a switch CDV.

Action
The policing action the switch will take in case of bandwidth violation on a signaling channel. The value set here overrides the default value of switch policing Action. Possible values are `tag` and `drop`.

Remote ATM
The ATM address of the entity connected to this signaling path.

Remote IP
The IP address of the entity connected to this signaling path.

Type
The type of the signaling path connection. `uni` (Unit Network Interface) means that there is a host on remote side, while `nni` (Network Network Interface) means there is another switch, that speaks SPANS, on the remote side.

Topology Configuration View

Access: *From the **Software Switch Configuration View**, click the **Topology** button.*

Hello Interval
The time interval in milliseconds between successive Hello Indication messages sent by SPANS.

NSAP Ind Interval
The time interval in milliseconds between successive NSAP Indication messages sent by SPANS.

Static Update Interval
The time interval in milliseconds between successive refreshes of NSAP static routes in the NSAP topology.

Max Hop Count
The upper limit on the number of hops in the source routes computed by the NSAP router.

ACR Proportional Mult
The proportional multiplier expressed as a percentage of Available Cell Rate (ACR). If the percentage change of the ACR of any given link in the NSAP topology exceeds this threshold, then the change is deemed significant.

Min Thresh
The capacity value in cells per second of the minimum value that the threshold value for determining the significant change can take. This minimum value is used to ensure that the threshold for determining significant changes to ACR does not become a very small value in cases where product of the ACR and the proportional multiplier is a very small number.

Min VC Avail
The minimum number of VCs that should be available on a link before the state of the link changes from VCs-not-available to VCs-available. This state is propagated in the link state information. The state changes from VCs-available to VCs-not-available when the number of VCs available becomes zero from a non-zero value.

SPANS Area ID
The ID of the area in the SPANS routing hierarchy to which this switch belongs. This number goes into the most significant byte of the SPANS ATM address.

SPANS Border Switch
Indicates whether this switch is configured to operate as a SPANS-NNI Border Switch or not. Possible values are enabled or disabled.

Switch Prefix
The default NSAP (Network Service Access Point) prefix for this ATM switch. The NSAP prefix will be used in the ILMI address registration message as well as the 'hello-indication' SPANS-NNI message.

Switch Prefix Mask
This mask gives the number of leading bits in the above prefix to be used to aggregate the addresses that belong to the switch in SPANS-PNNI alias FORE-PNNI.

Peer Group Mask
This mask gives the number of the leading bits in the above prefix to be used to aggregate the addresses that belong to the peer group containing this switch in SPANS-PNNI alias FORE-PNNI.

SPANS PNNI Border Switch
Indicates whether this switch is configured to operate as a SPANS-PNNI Border Switch or not. Possible values are `enabled` and `disabled`.

PGSN Reach Cost
Indicates the cost of link from border node to PGSN.

PGSN Reach Cost Method
Indicates the method of computing cost of link from border node to PGSN. Possible options are `user` and `default`.

FT-PNNI Fore Area
The area ID of the FT-PNNI autonomous system in the global Fore hierarchy of PNNI and FT-PNNI peer groups.

FT-PNNI Fore Level
The level of the FT-PNNI autonomous system in the global Fore hierarchy of PNNI and FT-PNNI peer groups.

LBUbr Load Balance
Indicates whether this switch is to do Load Balanced UBR routing. Possible values are `disable` and `enable`.

Board Cluster

Opens the *Board Cluster Table View*.

Board Links

Opens the *Topology - Board Link Table View* (Page 87).

Topology Links

Opens the *Topology - Link Table View* (Page 88).

Board Cluster Table View

Access: *From the **Topology Configuration View**, click the **Board Cluster** button.*

Board Cluster Configuration Table

A table of ATM switch cluster configuration information.

Board
The index of this switch board within the ATM switch cluster.

MaxPaths
The maximum number of input VPIs on this switch board.

MaxChan
The maximum number of input VCIs on this switch board.

ATM Address
The address of this ATM switch board.

Uptime
The length of time this ATM switch board has been up, in hundredths of a second.

ClockScaling
This specifies the value written into the switch boards Time Scaling Factor register. The Time Scaling Factor is an 8-bit register that determines

the number of 25ns clock cycles that occur between increments of the Time and Interrupt Timer Registers. Increasing the Time Scale Factor increases the burst tolerance that can be represented by the policer (in multiples of .838 seconds) while reducing the precision of the policer by a similar factor.

Debug
Indicates whether or not debugging services are available via TCP port 6532 for this switch.

McastMode
Identifies the mode in which this ATM switch board is operating. Extended-mode provides greater flexibility when selecting VCI for point to multipoint connections. Non-extended (mixed) mode is more restrictive. If any series A or B netmodes are present, the switch board should operate in non-extended mode.

FingerMode
Possible values are `enabled` or `disabled`.

Topology - Board Link Table View

Access: *From the **Topology Configuration View**, click the **Board Links** button.*

Board Topology

Board
The index of this switch board within the ATM switch cluster.

Inter-Sw Links
The current number of inter-switch links known by this switch board.

Board Link Table

Board
The index of this switch board within the ATM switch cluster.

Source
The ATM address of the source switch of this link.

Destination
The ATM address of the destination switch of this link.

Capacity
The free capacity of this link in kilobits per second.

Age
The accuracy of the information about this link. The actual value has no units associated with it. It should be used for comparison.

Topology - Link Table View

Access: *From the **Topology Configuration View**, click the **Topology Links** button.*

Source
The ATM address of the source switch of this link.

Destination
The ATM address of the destination switch of this link.

Capacity
The free capacity of this link in kilobits per second.

Age
The freshness of the information about this link. The actual value has no units associated with it. It should be used for comparison.

PNNI SPVC/SPVPC Configuration View

Access: *Within the **Software Switch Configuration View**, click the **PNNI SPVC Config** button.*

PNNI SPVCs

Pace Interval
The time interval between successive callbacks to the SPVC controller to open to the destinations of a batch of SPVCs.

Pace Num SPVCs
The maximum number of SPVCs that each batch of SPVCs that the controller tries to open to per Pace Interval.

Reroute Interval
The time interval between successive callbacks to the SPVC controller to reroute existing SPVC connection if a better path is available to the destination.

Reroute Num SPVCs
The number of SPVCs that are attempted to be rerouted by the SPVC controller per Reroute Interval.

Reroute Threshold
The percentage improvement in the cost that the new SPVC path must have over the current SPVC path before a reroute will be performed.

Lowest Priority
The value of lowest priority for SPVCCs.

Dflt UBR B'Width
The default bandwidth in Kilo-CPS to be used for UBR SPVCs.

Backoff Interval
The time interval to backoff a DTL that failed call setup. The DTL will not be used again until this interval has elapsed. The interval will not be applicable if backoff is disabled on the SPVC.

Trap Mode
This specifies whether the switch should send the following traps: spvcRerouteInitiated, pnniSpvccUp, pnniSpvccFail pnniSpvvccDown, nniSpvccFail, and pnniSpvccUp. The options are `reroute`, `failure`, `all`, or `none`.

Smart Permanent Virtual Path Connections (SPVPCs)

Pace Interval
The time interval between successive callbacks to the SPVCPC controller to open connections to the destinations of a batch of SPVCCs. This parameter along with Pace Num SPVPCs control the rate at which the SPVPCs that are down are established.

Reroute Interval
The time interval between successive callbacks to the SPVPC controller to reroute existing SPVPC connections if a better path is available to the destination. This is one of the parameters that control the rate at which rerouting is attempted.

Pace Num SPVPCs
The number of SPVPCs that are attempted to be rerouted by the SPVPC controller per ReRoute Interval. Thus it determines the rerouting rate.

Reroute Threshold
The percentage improvement in the cost that the new SPVPC path must have over the current SPVPC path before a reroute will be performed.

Lowest Priority
The value of lowest priority for SPVPCs.

Trap Mode
This specifies whether the switch should send the following traps: spvcRerouteInitiated, pnniSpvccUp, pnniSpvccFail pnniSpvvccDown, nniSpvccFail, and pnniSpvccUp. The options are `reroute`, `failure`, `all`, or `none`.

Backoff Interval
The time interval to backoff a DTL that failed call setup. The DTL will not be used again until this interval has elapsed. The interval will not be applicable if backoff is disabled on the SPVPC.

PMPSPVC Pty Pace No
The maximum number within a PMP SPVC that are activated per Pacing Interval.

Smart PVC Source Table View

Access: *From the **PNNI SPVC/SPVCP Configuration view**, click on the **SPVC Source** button.*

Number of SPVCs out of this switch

Srce ID
The unique identifier of the SPVC (Smart Permanent Virtual Circuits) source switch.

Address
The ATM address of the source switch.

Dest ID
The ATM address of the destination switch.

Address
The IP address of the source switch.

In Port
The input port of this SPVC, which is the same as the chanrInputPort, chanPort, pathPort, and portNumber.

In VPI
The input VPI of this SPVC, which is the same as the chanrInputVPI, chanVPI, and pathVPI.

In VC
The input VCI of this SPVC, which is the same as the chanrInpputVCI.

Alloc B
The allocated bandwidth of this SPVC.

Uptime
The time since this SPVC was created in hundredths of a second.

Status
The status of this SPVC.

Entry Status
The status of this SPVC entry.

Smart PVC Destination Table View

Access: *From the PNNI SPVC/SPVCP Configuration view, click on the SPVC Dest button.*

Number of SPVCs out of this switch
The number of SPVCs that are coming into this switch (i.e. this switch is their destination).

Srce ID
The SPVC identifier at the source switch. This object should match the SpvcId at the source switch.

Address
The ATM address of the source switch.

Dest ID
The ATM address of this (the destination) switch.

Address
The IP address of this switch.

In Port
The input port of this SPVC, which is the same as the chanrInputPort, chanPort, pathPort, and portNumber.

In VPI
The input VPI of this SPVC, which is the same as the chanrInputVPI, chanVPI, and pathVPI.

In VC
The input VCI of this SPVC, which is the same as the chanrInpputVCI.

Alloc B
The allocated bandwidth of this SPVC.

Uptime
The time since this SPVC was created in hundredths of a second.

Status
The status of this SPVC.

Entry Status
The status of this SPVC entry.

PNNI SPVC Source Table View

Access: *From the **PNNI SPVC/SPVCP Configuration view**, click the **PNNI SPVC Src** button.*

PNNI SPVC Source Table

This table contains information about SPVCs that have their source at this switch.

Index
The unique index identifier of the SPVCs that have their source at this switch.

Name
The name of the switch.

In Port
The Input port of this SPVC.

In VPI
The Input VPI for this SPVC.

In VCI
The Input VCI for this SPVC.

Dst Port
The port of this SPVC at the destination end.

VPI/VCI Sel
The Called VPI/VCI value selection qualifier.

Called VPI
The VPI to be used at the Called NI for this SPVC.

Called VCI
The VCI to be used at the Called NI for this SPVC.

PNNI SPVC Source Table Detail View

Access: *From the **PNNI SPVC Source Table**, double-click on an entry value.*

Index
The value of this object uniquely identifies the SPVCs that have this switch as their source.

Calling Port
The input port of this SPVC, and is the same as the chanrInputPort, chanPort, pathPort, and portNumber.

Calling VPI
The VPI to be used at the Calling NI for this SPVC.

Calling VCI
The VCI to be used at the Calling NI SPVC.

Called ATM Addr
The ATM address of the distant end NI (remote switch) for this SPVC.

Called Port
Identifies the port of this SPVC at the destination end. It has a value of -1 if the port at the destination switch cannot be determined.

Called VPVC Sel
The Called VPI/VCI value selection qualifier.

Called VPI
The VPI to be used at the Called NI for this SPVC.

Called VCI
The VCI to be used at the Called NI for this SPVC.

Called Assigned VPI
The VPI assigned at the Called NI for this SPVC. This value is only meaningful if the SPVC status is up.

Called Assigned VCI
The VCI assigned at the Called NI for this SPVC. This value is only meaningful if the SPVC status is up.

Fwd UPC Key
The forward UPC traffic contract key for this SPVC. This key must be defined in the UPC Contract Table.

Bck UPC Key
The backward UPC traffic contract key for this SPVC. This key must be defined in the UPC Contract Table.

Bearer Class
The requested broadband bearer class for this SPVC.

Suscept Clip
The requested broadband bearer susceptibility for this SPVC.

Fwd Qos Class
The requested quality of service for this SPVC in the forward (calling to called) direction. Should be made read-write when supported.

Bck Qos Class
The requested quality of service for this SPVC in the backward (called to calling) direction. Should be made read-write when supported.

Transit Net Sel
The optional transit network selection for this SPVC.

Retry Count
The number of times the call setup has been attempted since the SPVC creation or the last successful call setup.

Last Change Time
The time since this SPVC has been up/down in hundredths of a second.

Status
The operational status of this SPVC.

Name
The value of this object identifies the name that has been assigned for this SPVC.

Entry Status
The status of this SPVC entry.

Route Cost
The cumulative route cost for the current route of this SPVC.

Reroute Status
The status of the reroute function for this SPVC. If set to `disabled`, no rerouting will be attempted for this SPVC.

Calling Domain
The domain ID to be used at the Calling NI.

Last Fail Cause
The cause of the last call setup failure.

Last Location
The last call setup failure location code for this SPVC. This indicates the switch that initiated the clearing for the call. This is formatted as a test string with the fields:

Table 27: Last Call Setup Failure Location

Value	Definition
FMT	Diagnostic format
RMT	Indicates whether a remote switch is the source of failure or this switch inserted the location diag.
LINK	Link ID that clear pertains to.
VPI	VPI that clear pertains to.

Qos Index
The index for the QOS Class Expansion Table to be used for this SPVC.

Backoff Status
The status of the backoff function for this SPVC. If set to disabled, directed dtls configured for this SPVC will be continually retried on failure.

Priority
The priority of this SPVCC for connection.

Old Route Cost
This is specified only to be included in the pnniSpvcUp trap. It specifies the path cost of the call the previous time this call was up. If the call has not been up, this will report a value of -1.

Down Reason
This is specified only to be included in the pnniSpvccDown and pnniSpvccFail traps. This specifies whether the SPVC call was cleared due to a better route being found, a network failure, or SPVC deletion.

Active Dtl Node Index
The Node index of the Active Designated Transit List for this SPVC. The active DTL indexed by the node index and DTL index identifies the DTL that is currently used by the SVC portion of the SPVC. The value of this object is 65535 for FTPNNI nodes.

Dtl Tag
This value specifies an index into a table of DTLs, the DTL entries in this table will be used to setup the SPVC.

Auto Dtl Status
The status of the dynamic path selection function for this SPVC. Can be set to either `enabled` or `disabled`. If set to `disabled`, auto path selection will not be used.

PNNI SPVC Destination Table View

Access: *From the **PNNI SPVC/SPVCP Configuration view**, click on the **PNNI SPVC Dest** button.*

This table contains information about SPVCs that have their destination at this switch.

Index
The value of this object uniquely identifies the SPVCs that have this switch as their source.

Calling Port
The port of this terminating SPVC at the source end. It has a value of -1 if the port at the destination switch cannot be determined.

Calling VPI
The VPI to be used at the Calling NI for this SPVC.

Calling VCI
The VCI to be used at the Calling NI for this SPVC.

Called Port
The port of this terminating SPVC at the destination end. It has a value of -1 if the port at the destination switch cannot be determined.

Assign VPI
The VPI assigned at the Called NI for this SPVC. This value is only meaningful if the SPVC status is up.

Assign VCI
The VCI assigned at the Called NI for this SPVC. This value is only meaningful if the SPVC status is up.

Calling ATM Address
The ATM Address to be used at the Calling NI for this SPVC.

Called ATM Address
The ATM address of the distant end NI (remote switch) for this SPVC.

SPVPC Source Table View

Access: *From the **PNNI SPVC/SPVCP Configuration view**, click on the **SPVPC Source** button.*

This table contains information about SPVPCs that have their source at this switch. This table serves the same function that the PNNI SPVC Source Table serves for SPVCCs.

Name
The name of the port.

Port
The input port of this SPVPC and is the same as the chanrInputPort, chanPort, pathPort, and portNumber. The maximum value of this variable depends on the type of the switch.

VPI
The VPI to be used at the originating switch for the permanent portion of this SPVPC.

Port
The port where the permanent portion of this SPVPC resides at the destination switch. It has a value of -1 if this port at the destination cannot be determined.

VPI
The VPI to be used at the destination switch for the permanent portion of this SPVPC. The range given above is the maximum possible.

Ass'd VPI
The VPI that is assigned at the destination switch for the permanent portion of this SPVPC. This value is only meaningful if the SPVPC status is up.

VPI/VCI Sel
The originating switch for a SPVPC can specify the VPI to be used for the permanent portion of this SPVPC at the destination switch. The value of this object indicates whether the SPVPC was configured with a specific value for this VPI/VCI or not. `require` indicates that the user configured a specific value for this VPI and `noPref` indicates that the user did not specify any.

Retries
The number of times the call setup has been attempted since the SPVPC creation or the last successful call setup for this SPVPC.

Status
The operational status of this SPVPC. The value of up indicates that this SPVPC is operational and down indicates that the SPVPC is not-operational.

PMP SPVCC Source Table View

Access: *From the **PNNI SPVC/SPVCP Configuration view**, click on the **PMP SPVCC Source** button.*

This table contains information about the root side of PMP SPVCC that have their source at this switch. It also contains the connection parameters that are common to all the parties.

Port
Identifies the input port of this PMP SPVCC and is the same as the chanrInputPort, chanPort, pathPort, and portNumber.

VPI
The VPI to be used at the Calling (root) NI for this PMP SPVCC.

VCI
The VCI to be used at the Calling (root) NI for this PMP SPVCC.

Name
The name of the

FwdUPCKey
The forward UPC traffic contract key for this PMP SPVCC. This key must be defined in the UPC Contract Table. Backward UPC traffic does not apply to PMP service.

BearerClass
The requested broadband bearer class for this PMP SPVCC.

SusceptClip
The requested broadband bearer susceptibility for this PMP SPVCC.

FwdQOSClass
The requested quality of service for this PMP SPVCC in the forward (calling to called) direction. Backward direction does not apply to PMP SPVCCs.

Status
The operational status of this PMP SPVCC. Possible values are `up`, `down`, and `wait`.

PMP SPVCC Destination Table View

Access: *From the **PNNI SPVC/SPVCP Configuration view**, click on the **PMP SPVCC Dest** button.*

ATM Address
The ATM address of the root of the PMP SPVCC that has one or more parties terminating at this switch.

Port
Identifies the port of this terminating PMP SPVCC at the source end. It has a value of -1 if the port at the destination switch cannot be determined.

VPI
The VPI used for the PVCC portion of the connection at the root of the PMP SPVCC. The root switch is identified by **ATM Address**.

VCI
The VCI used for the PVCC portion of the connection at the root of the PMP SPVC. The root switch is identified by pnniPmpSpvccDestRootEntry.

Bearer Class
The broadband bearer class signalled for the first party of this PMP SPVCC. All subsequent parties should have the same value.

SusceptClip
The broadband susceptibility to clipping signalled for the first party of this PMP SPVCC. All subsequent parties should have the same value. Possible values are `no` and `yes`.

FwdQoSClass
The requested quality of service for this PMP SPVCC in the forward (from root to leaves) direction. Backward QoS requirements do not apply to PMP SPVCCs. Possible values are `class0`, `class1`, `class2`, `class3`, and `class4`.

NoOfParties
Number of parties currently terminating at this switch within this PMP SPVCC.

PMP SPVCC Source Party Table View

Access: *From the **PNNI SPVC/SPVCP Configuration view**, click on the **PMP SPVCC Src Party** button.*

ATM Address
The ATM address of the distant end NI (remote switch) for this party.

VP/VCSel
The Called VPI/VCI value selection qualifier. Possible values are `noPref` and `require`.

VPI
The VPI to be used at the Called NI for this party.

VCI
The VCI to be used at the Called NI for this party.

Name

AssignedVPI
The VPI assigned at the Called NI for this party. The value is only meaningful if the party status is `up`.

AssignedVCI
The VCI assigned at the Called NI for this party. This value is only meaningful if the party status is `up`.

Status
Operational status of this party in the PMP SPVCC. Possible values are `up`, `down`, and `connecting`.

LastFailCause
The last setup failure cause code for this party.

PMP SPVCC Destination Party Table View

Access: *From the **PNNI SPVC/SPVCP Configuration view**, click on the **PMP SPVCC Dest Party** button.*

This table contains information about the parties of PMP SPVCCs that terminate at this switch.

ATM Address
The ATM address of the switch where this party of a PMP SPVCC terminates.

Port
Identifies the port where this party of a PMP SPVCC terminates. It has a value of -1 if the port at the destination switch cannot be determined.

AssignVPI
The VPI assigned for this party of a PMP SPVCC at the terminating switch. This value is only meaningful if the party status, identified by Status is `up`.

AssignVCI
The VCI assigned for this party of a PMP SPVCC at the terminating switch. This value is only meaningful if the party status, identified by Status is `up`.

Uptime
The time since this party of PMP SPVCC was created in hundredths of a second.

Transit
The optional transit network selection for this party of PMP SPVCC.

Status
The operational status of this party of PMP SPVCC. Possible values are `up`, `down`, and `failed`.

RGroupIndex
Specifies the entry in the SPVXC Redundancy Group table for information regarding the secondary port to be used as the redundant port. This will be used at the terminating PVC end.

PNNI SPVXC Redundancy Group Table View

Access: *From the **PNNI SPVC/SPVCP Configuration view**, click on the **Redundancy** button.*

A table of Primary to Secondary Port mappings that will be used for redundancy in permanent portion of SPVxCs.

Pri Port
The primary port of this entry. This will be used as the primary PVC port for the SPVC created with this group index.

Sec Port
The secondary port of this group. This will be used as the redundant PVC port for the SPVC created with this group index. During a switch, the PVCs will be switched from primary port to this port.

Name
The name that has been assigned for this group.

NSAP Address
The default NSAP address associated with this group using the default domain's prefix. This is a read-only variable available to view the default NSAP address associated with this group.

SwitchoverCmd
Defines the switchover command. The value of `switch2primary` is used to switch over the permanent PVC portion to the primary port. The value of `switch2secondary` is used to switch over the permanent PVC portion to the secondary port. If the permanent portions are already on the specified port, no action is taken.

ActivePort
The port that is active. This can take any one of the primary or secondary port values. This is a read only variable useful to check the currently active port.

PacingNo
The pacing number of this group. During a pacing interval, pacing number of SPVCs will be attempted for PVC switch over.

PacingInt
The pacing interval in units of milliseconds for this group. Every time a switchover command is issued, pacing number of SPVCs will be

attempted for PVC switch over every pacing interval.

AutoPVCSwOver
Allows you to determine if the automatic switchover of the PVC portion is `enabled` or `disabled`. The default value is disabled.

State
The state of the Redundancy Group. `operational` indicates that this group is in the normal state and switchover is not going on. `switchover_in_progress` indicates that switchover is presently going on for this group. In this state no new SPVCs can be added to this group.

RowStatus
The status of this group entry.

NSAP Static Route Table View

Access: *From the **Software Switch Configuration View**, click the **NSAP Static Route** button.*

Address
Identifies the destination NSAP (Network Server Access Point) address.

Mask
The mask that is used for this NSAP address.

Port
The port through which this NSAP address can be reached.

VPI
This value identifies the path through which this NSAP address can be reached.

Cost
The cost associated with this Static Route. This cost is to be used as a metric while routing.

CBR Cap
The maximum capacity available on this route for CBR connections.

Mx CBR Cap
The maximum capacity available on this route for VBR connections.

AbrSupport
The capability to support ABR traffic on this route.

EpdSupport
Displays the capability to support Early Packet Discard (EPD) on this route. Possible values are `supported` and `unsupported`.

Status
The status of this NSAP address. Setting this object to `invalid` causes this address to disappear.

Fore Dual SCP Application (ForeDualSCPApp)

Dual SCP (Switch Control Processor) Application Configuration View

Access: *From the **Icon Subviews** menu for the ForeDualSCPApp icon, select **Configuration**.*

Dual SCP Configuration Table

A table for the current state of Dual Switch Control Processor configuration.

Slot
The slot number for this Switch Control Processor (SCP).

State
Displays whether the switch is operating with single or dual SCPs. The value `other` denotes that both SCPs are present but communication is not yet established. Possible values are `standalone`, `dual`, and `other`.

SyncState
This variable contains the current state of synchronization.

Primary
Controls which SCP is designated as the primary SCP, either `slotX` or `slotY`.

Failover
Allows you to `enable` or `disable` the dual SCP failover mechanism. When set to disable, the backup SCP will not take over if the main SCP goes down.

Sync Requests
This can be used to manually synchronize the entire flash or any of the specified files. syncInit reformats the entire flash. Other possible values are `syncIdle`, `syncFlash`, `syncCdb`, `syncPassword`, `syncLescConfig`, `syncOS`.

Sync Failures
The number of times synchronization has failed.

Fore Shared Memory Network Application (ForeShMemApp)

This application provides the following subview:

- *Fore Shared Memory Network Module Configuration View*

Fore Shared Memory Network Module Configuration View

Access: *From the **Icon Subviews** menu for the ForeShMemApp icon, select **Configuration**.*

Shared Memory Configuration Table

A table for shared memory network modules configuration.

Index
The index of this shared memory configuration.

UcastConns
The maximum number of unicast connections that is supported by this shared memory configuration.

McastConns
The maximum number of multicast connections that is supported by this shared memory configuration.

VpiVciList
The memory allocated for VPI/VCI lists (which is used for multicast connections) by this shared memory configuration.

CellsBuffs
The number of cells buffers that is supported by this shared memory configuration.

ConfName
The name of this shared memory configuration.

Memory
The size of this shared memory configuration in terms of 48 bit words (x48).

Fore Lane Application (ForeLaneApp)

This application allows the management station to configure the LEC (Local Exchange Carrier) on a host or a switch.

- *Fore LANE Application Configuration View* (Page 104)
- *Fore LEC ARP Configuration View* (Page 105)
- *Fore LECS Configuration View* (Page 106)

Fore LANE Application Configuration View

Access: *From the **Icon Subviews** menu for the ForeLaneApp icon, select **Configuration**.*

LEC Configuration Table

This table contains Local Exchange Carriers and their parameters.

Index
The index to the LEC Configuration Table.

ElanName
Name of the emulated LAN to join.

AtmAddr
The ATM address of this LEC.

Admin
The desired state for this LEC. The default value is `up`.

Oper
The actual operating status of this LEC. Possible values are `up`, `down`, and `joining`.

MACAddr
The MAC address assigned to this LEC.

ConfType
The default configuration type of the LEC is based on the default value set in the ConfType variable. `automatic` means that the LEC will try to find LECs in the manner specified in the spec (ILMI, WellKnown, PVC). `manual` means that the LEC will use the address specified in the **Atm Addr** variable.

IfName
The name of the interface associated with this LEC.

LECSAddr
The ATM address of the LECS. The default ATM address of the LECS server is based on the default value set in the AtmAddr variable. When the ConfType is set to manual, this variable will be set to the Wellknown LECS address.

LESAddr
The ATM address of LES to join. If the **ConfType** is set to manual and this variable is set to address of an LES, this address will be used as the address of the LES to join.

Status
The status of this table entry. Possible values are `valid`, `createRequest`, `underCreation`, and `invalid`.

LES Configuration Table

Index
Index into the Local Exchange Server Configuration Table.

ElanName
Name of the emulated LAN associated with this entry.

AtmAddr
The ATM address of this LES.

Admin
The desired state for this LES. Possible values are `up` and `down`.

Oper
The actual status of this LES. Possible values are `up` and `down`.

BUSAtmAddr
The ATM address of the BUS associated with this LES.

BUSMaster
The configuration of the BUS associated with this LES. When this variable is set to enable, the LES will attempt to start the BUS on the current host.

Status
The actual status of this LES, either `up` or `down`.

LANType
The type of LAN associated with this LES.

MaxFrSize
Maximum frame size for this table.

SecServer

LEC ARP Table

Opens the LEC ARP Configuration View.

LECS Configuration

Opens the FORE LECS Configuration View.

Fore LEC ARP Configuration View

Access: *From the **Fore LANE Application Configuration View**, click the **LEC ARP** button.*

LEC Arp Table

A table of Local Exchange Carrier ARP (Address Resolution Protocol) entries.

ElanName
Name of the emulated LAN associated with this ARP entry.

MAC Address
The MAC address of this ARP entry.

AtmAddr
The ATM address associated with this ARP entry.

Flags
The flags associated with this ARP entry.

ConnVPI
The VCI associated with this connection.

ConnVCI
The VCI associated with this connection.

Flush
This variable causes the LEC ARP cache to be flushed when it is set to enable. Possible values are `enable` and `disable`.

Fore LECS Configuration View

Access: *From the **Fore LANE Application Configuration View**, click the **LES Configuration** button.*

This table contains LESes and their parameters.

LES Configuration Table

Index
The index into the LECS Configuration table.

AtmAddr
The ATM address of this LECS.

Admin
The desired state for LECS, either `up` or `down`.

Oper
The actual state of LECS, either `up` or `down`.

DataBase
The full path to the location and name of the LECS database.

Status
The status of this table entry. Possible values are `valid`, `createRequest`, `underCreation`, and `invalid`.

DefLESFlag
The option to use the default LES ATM address if the configuration file is inaccessible. Possible values are `enable` and `disable`.

DefLESAtmAdd
The ATM address of the default LES.

WellknAddrFl
The Wellknown address flag of the default LES.

WellKnAddress
The WellKnown address of the default LES.

Fore ATM User Application (ForeUserApp)

The ATM User (ForeUserApp) application provides connection information for devices containing a FORE Systems, Inc., ATM adaptor card. The application represents the device's interface with the ATM network. This application provides the following subviews:

- *Fore User Application Configuration View*
- *Connection Table* (Page 108)

Fore User Application Configuration View

Access: *From the **Icon Subviews menu** for the ATM User Application, select **Configuration**.*

This view includes the following fields that describe the device's ATM connection.

Hardware Version
The version of the ATM adapter hardware. The number is encoded into six hexadecimal digits.

Hardware Speed
The speed of the ATM adapter hardware.

Firmware Version
The version of the ATM adapter firmware. The number is encoded into six hexadecimal digits.

Software Version
The version of the ATM adapter software. The number is encoded into six hexadecimal digits.

Uptime
The length of time since the connection was created, in hundredths of a second.

Serial Number
The serial number of the ATM adaptor hardware.

Adaptor Type
The device's adaptor type number.

Rec Carrier
The presence or absence of a carrier on the link.

Port Number
The number of the port selected.

Oper Status
The current operational state of the adaptor.

ATM Address
The address of this ATM adaptor.

Physical Layer
The physical layer of the adaptor.

Connection Table

Access: *From the **Icon Subviews menu** for the ATM User Application, select **Connection Table**.*

This table includes the following fields that describe the ATM connections.

Interface
The ATM interface.

Direction
The direction of the ATM interface.

VPI
The virtual path identifier for this connection.

VCI
The virtual channel identifier for this connection.

Local SAP
The local service advertising protocol for this connection.

Remote SAP
The remote service advertising protocol for this connection.

Remote Address
The ATM address of the ATM end of this connection.

Peak Bandwidth
The peak bandwidth for this connection, in Kbps.

Mean Bandwidth
The mean bandwidth for this connection, in Kbps.

Mean Burst
The mean burst length for this connection, in Kilobits.

Uptime
The length of time since this connection was created, in hundredths of a second.

ForeView Application

This section describes how to install ForeVIew applications onto NT and Solaris platforms.

ForeView is an application purchased separately from the ForeRunner management module. This application can provide additional management of ForeRunner modeled devices. For further information, see the Marconi (Fore) website: www.marconi.com

Additional menu options will appear for ForeView applications by setting an environment variable for NT/2000 and Solaris platforms.

For NT/2000

To install ForeView applications:

1. Shut down SpectroGRAPH
2. Bring up the Control Panel
3. Select Environment Tab
4. Add System Variables. For Set Entries Display type “FVIEW”. For Value type “FVIEW=/<ForeView Install Path>/bin
5. Click the Set Button
6. Bring up the SpectroGRAPH. ForeRunner menu options should now include ForeView applications.

For Solaris

To install ForeView applications:

1. Shut down SpectroGRAPH
2. cd to /opt/SPECTRUM
3. As root user, vi spectrum60.env
4. Add entry FVIEW=/<ForeView Install Path>/bin
5. Bring up the SpectroGRAPH. ForeRunner menu options should now include ForeView applications.

Networking Characteristics

This section provides an overview of how the ForeRunner devices function in the ATM network.

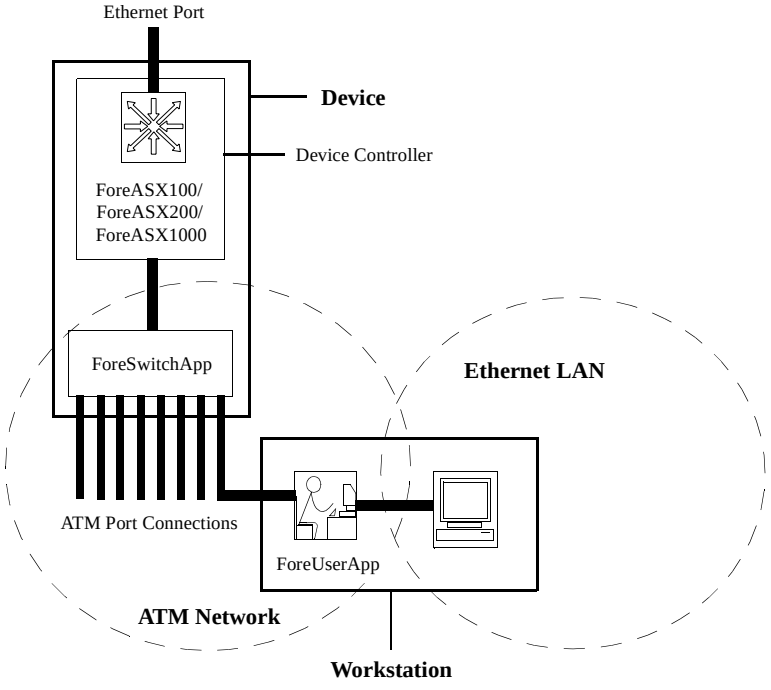
Asynchronous Transfer Mode (ATM) is based on the transmission of fixed-length (53-byte) cells of data. Contrast this with an Ethernet LAN, which transmits variable-length packets ranging in size from 64 to over 1500 bytes of data. ATM's use of small, fixed-length data cells allows for improved traffic management and traffic shaping.

ATM is a connection-oriented network communication architecture, which generally means that it transmits data through pre-established virtual channels (circuits), similar to telephone calls. Virtual channels may be established automatically by Switched Virtual Circuit (SVC) signaling or they may be set up manually by the network administrator to form Permanent Virtual Circuits (PVCs).

Each ATM cell contains a five-byte header and 48 bytes of payload. The header includes a Virtual Path Identifier (VPI) and a Virtual Channel Identifier (VCI). These identifiers are used by ATM switches to determine the correct channels to transmit particular cells. Transmission is controlled by statistical multiplexing, which awards bandwidth (channels) to devices ready to send data on a first come, first served basis. The combination of small, fixed-length data cells and the efficient use of bandwidth (among other things) allow ATM switches to communicate time-critical video and audio data along with other computer data across the ATM network. In an end-to-end transmission across a mixed LAN/ATM/LAN network, packets transmitted by a LAN workstation to an ATM switch are segmented into cells for high speed transmission through ATM channels. At the receiving end, cells are reassembled into packets for use by another LAN workstation.

Figure 12 is a functional block diagram of a ForeRunner device and its ATM and LAN network connections. The device contains either a 9A000, SFCS, or ASX controller. Figure 12 also shows how SPECTRUM models the devices, the network applications, and the workstations in your network. SPECTRUM models Forerunner devices as either a ForeASX100, ForeASX200, or ForeASX1000.

Figure 12: ForeRunner Device and its Network Connections



Functionally, a device is divided into the device controller and the ForeSwitchApp. The ForeSwitchApp is grouped by function into the ATM network with the ForeUserApp, which is itself contained within a user node such as a multi-homed workstation.

A multi-homed workstation is a workstation containing firmware that makes it part of the Ethernet and ATM networks to which it is connected. Therefore, the workstation's ForeUserApp provides the connection between the ATM network and the Ethernet LAN.

Manual Modeling

This section describes the procedures for modeling single and multiple devices and workstations.

Modeling these devices involves creating a switch model at the Universe level, creating ATM and LAN or discrete LAN conceptual network models, and configuring application models within the conceptual network models.

This section includes the following topics:

- *Read Me First* (Page 112)
- *Modeling a Single Device and Workstation* (Page 112)
- *Modeling Multiple Devices and Workstations* (Page 117)

Read Me First

It is recommended that you model your network automatically using SPECTRUM's AutoDiscovery feature to ensure the best modeling of your network. (See the ***AutoDiscovery User's Guide*** for details on modeling your network.) Before modeling your network, you must model an ATM device "seed switch" within the network.

SPECTRUM uses the seed switch as a starting point to identify the other devices within the ATM network. Once you have discovered and modeled your network devices manually or using SPECTRUM AutoDiscovery, you must run ATM Discovery. Refer to ***ATM Switch Discovery Process*** for instructions on running ATM Discovery from the command line.

If you choose to model your network manually, use the procedures described in this section.

Modeling a Single Device and Workstation

This section describes the procedure for modeling a single device and its related applications and conceptual models. Figure 13 provides a conceptual overview of the modeling of a single device and workstation (user application).

Figure 13: Modeling of a Single Device and Workstation Conceptual Overview

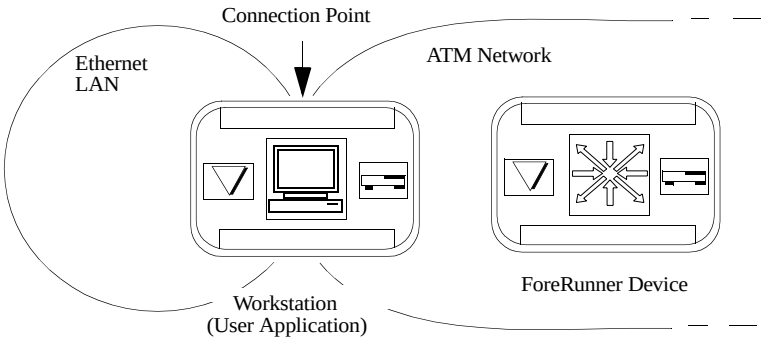
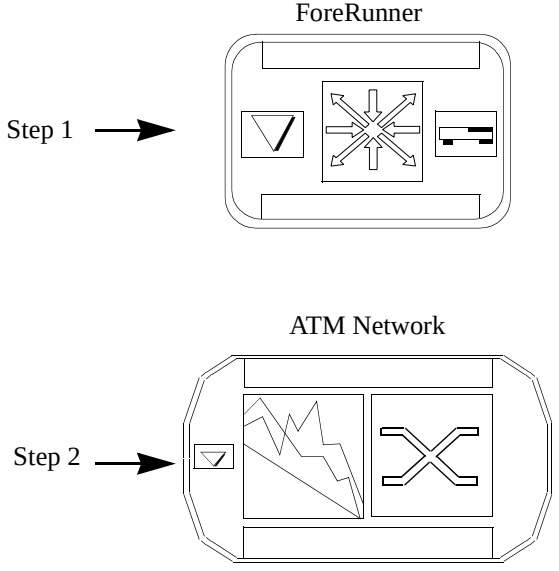


Figure 14: Creating the Universe Level Models



In the following procedure, the step numbers in the text correspond to the step numbers in the illustrations.

1. Create a ForeRunner switch model at the Universe level (Figure 14).
2. Create an ATM_Network model at the Universe level.
3. Create the LAN or discrete LAN model at the Universe level (Figure 15).
4. Go into the LAN or discrete LAN model.
5. Create a Workstation model with GnSNMPDev representing the ATM endpoint.

Figure 15: Creating the Workstation Model

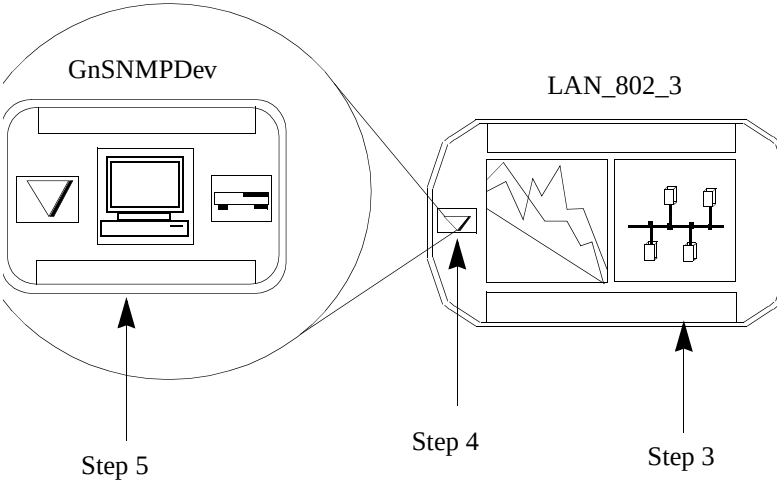
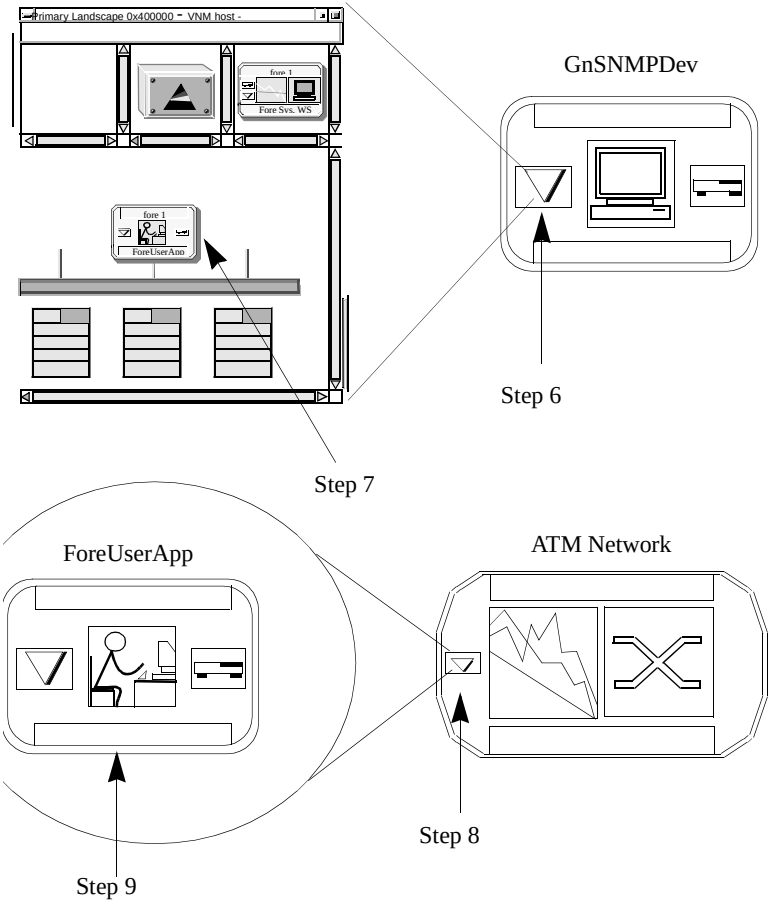


Figure 16: Pasting the ForeUserApp Model into the ATM_Network Model



6 Go into the Workstation (GnSNMPDev) model's Topology view (Figure 16).

7 Highlight and Edit/Copy the ForeUserApp model.

8 Go into the ATM_Network model.

9 Paste the ForeUserApp model into the ATM_Network model.

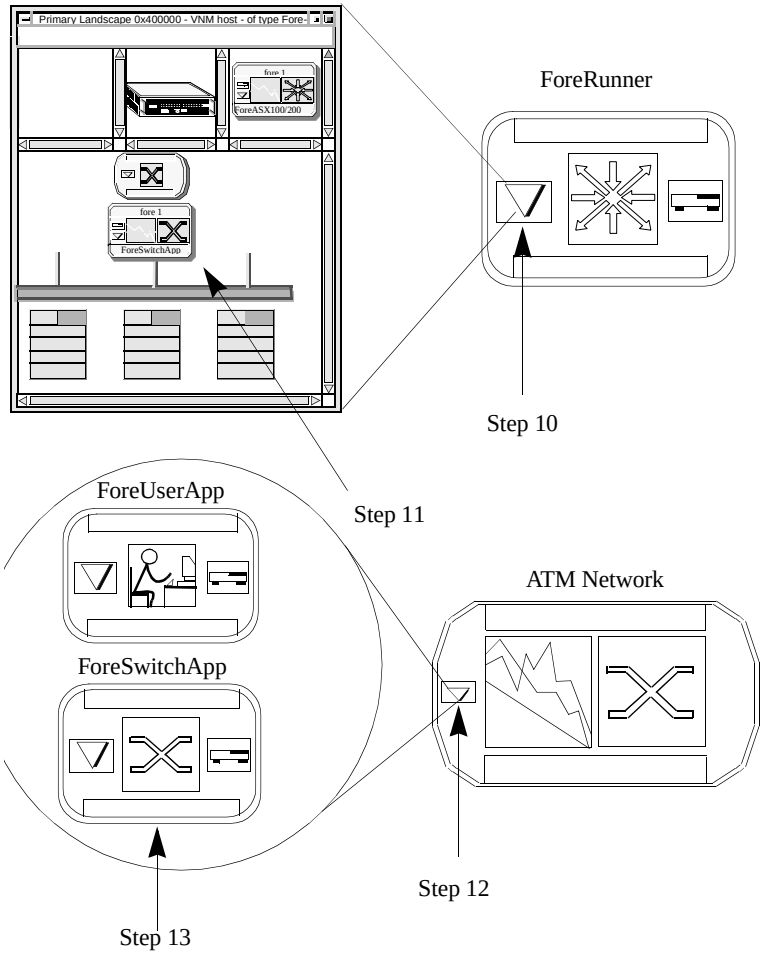
10 Go into the ForeRunner model's Topology view (Figure 17).

11 Highlight and Edit/Copy the ForeSwitchApp model.

12 Go into the ATM_Network model.

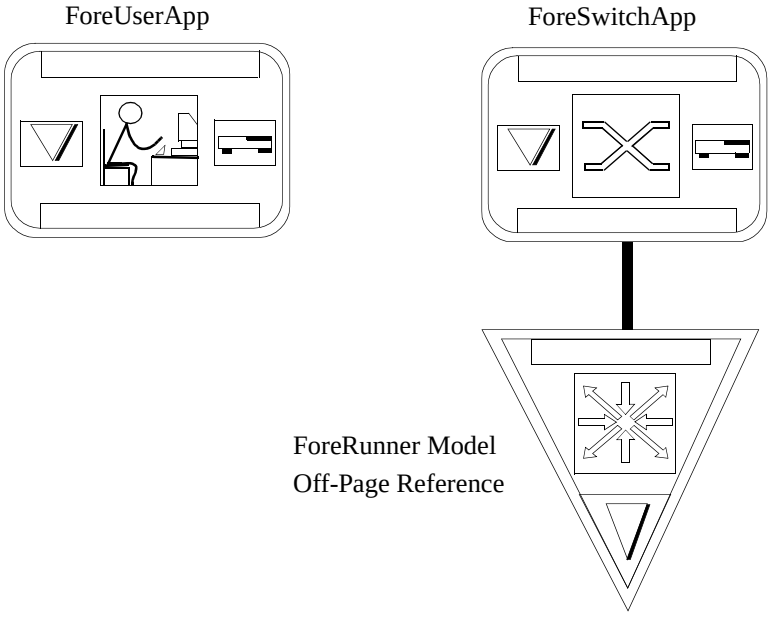
13 Paste the ForeSwitchApp model into the ATM_Network model.

Figure 17: Pasting the ForeSwitchApp Model into the ATM_Network Model



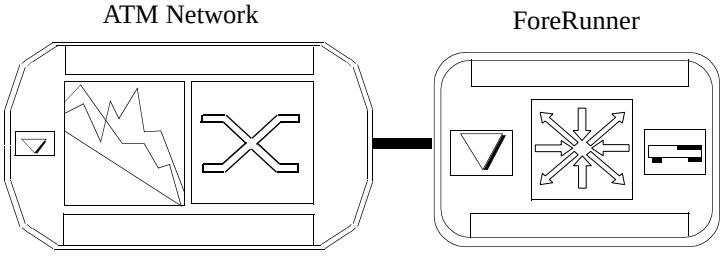
An Off-Page Reference icon representing the ForeRunner model will be connected to the ForeSwitchApp model in the ATM_Network model (Figure 18).

Figure 18: ForeRunner Off-Page Reference



At the Universe level, a logical pipe connection will automatically be drawn between the ForeRunner model and the ATM_Network model (Figure 19).

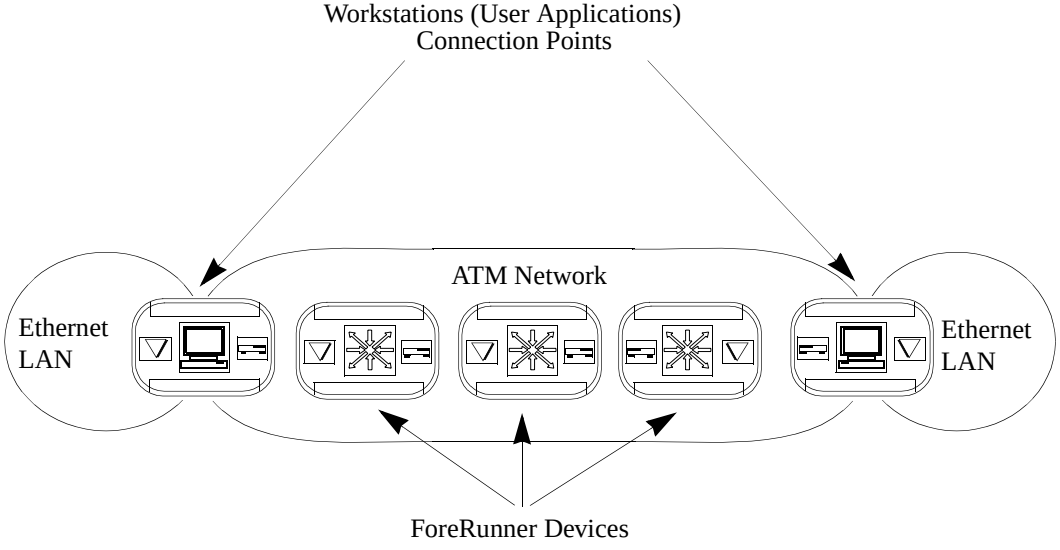
Figure 19: Automatically Placed Universe Level Logical Pipe Connection



Modeling Multiple Devices and Workstations

This section describes the procedure for modeling multiple ForeRunner devices and related applications and conceptual models. Figure 20 provides a conceptual overview of the modeling of multiple devices and workstations (user applications).

Figure 20: Modeling Multiple Devices and Workstations Conceptual Overview



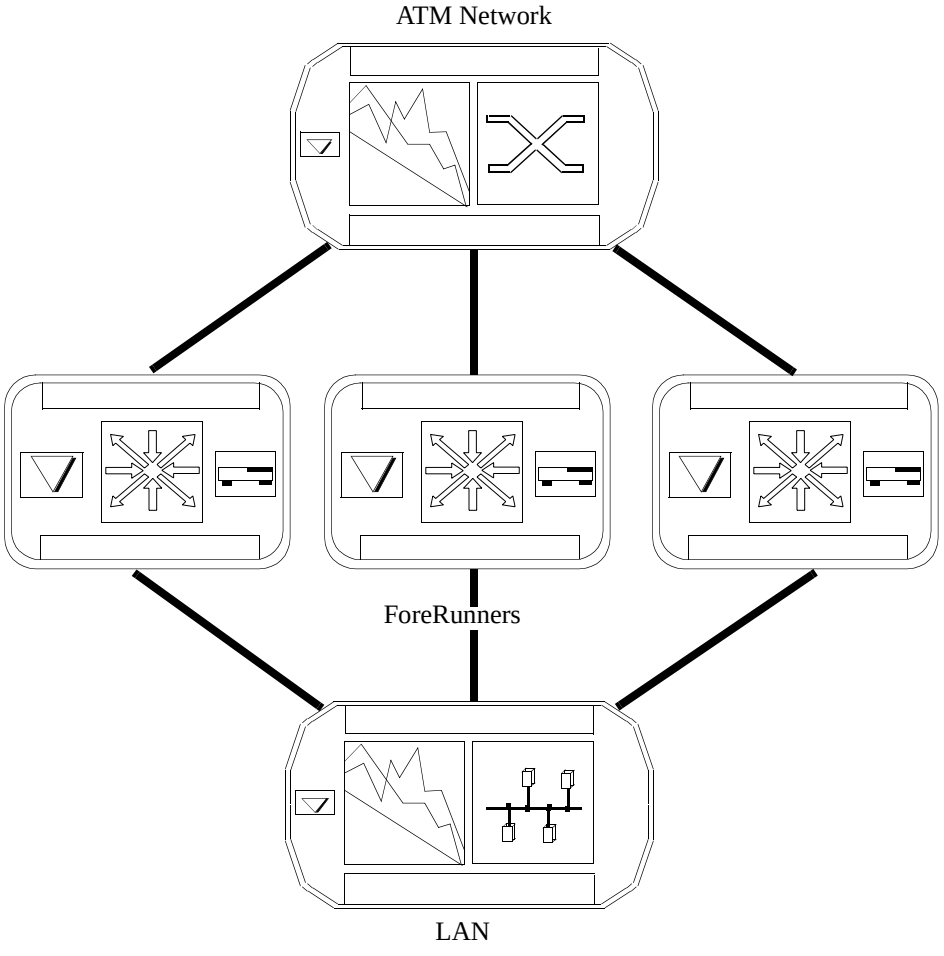
The process of modeling multiple ForeRunner devices is similar to the one for modeling single devices and involves the following procedures previously described:

1. Create the Universe level switch models.
2. Create additional GnSNMPDev workstation models.
3. Copy the ForeUserApp model from the workstation's Topology view and paste it into the ATM Network model.
4. Copy the ForeSwitchApp model from each additional switch's Topology view and past it into the ATM Network model.

In the Universe level, logical pipe connections will automatically be drawn between the new ForeRunner models and the ATM_Network model.

Figure 21 depicts the end results of this modeling process.

Figure 21: Automatically Placed Universe Level Logical Pipe Connections



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